FORGING THE SWORD:

DEVELOPING LEADERS FOR THE AIR OPERATIONS CENTER

BY

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DISCLAIMER

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ABSTRACT

This research addresses how the Air Force can best prepare officers for leadership positions in the Air Operations Center. Before examining Air Operations Center leadership development, this work begins with an historical survey of airpower command and control. Identifying the historical and enduring airpower command and control concepts enabled a comparison and subsequent determination that current Air Operations Center capabilities sufficiently incorporate historical airpower lessons. This study then examines the education and training system available for developing Air Operations Center leaders, and identifies areas of both success and concern. Recommendations and possible solutions for each concern complete this research.

Overall, this research determined that current Air Operations Center leadership development needs to be organized under a deliberate continuum that integrates both education and training across an entire career. Officers who have obtained significant experience and skill within the Air Operations Center must be diligently managed to ensure airpower command and control expertise exists at all ranks. Additionally, Air Operations Center personnel, technology, and processes must continue to strive for appropriate standardization in order to ensure the effectiveness of an Air Operations Center leadership development system. Further concerns, beyond the scope of this research, that affect Air Operations Center leadership development are identified as areas requiring additional study.

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ILLUSTRATIONS

Chapter 1

Introduction:
From the Past, the Present—From the Present, the Future

One of the least controversial things that can be said about command and control is that it is controversial, poorly understood, and subject to wildly different interpretations.

— Col Kenneth Moll, USAF
Understanding Command and Control

The intention of this study is to research and determine how the Air Force can best prepare officers for Air Operations Center (AOC) leadership positions. It begins by examining the historical precedent that has developed over the last century regarding the lessons of airpower command and control (C2). This examination organizes the enduring historical concepts under the three categories of *personnel, technology,* and *processes.* Comparing the historical concepts to the current capabilities of today's AOC determines if the enduring principles of airpower C2 are sufficiently incorporated into today's C2 operations. It is necessary to determine the appropriateness of current AOC capabilities before analyzing the subsequent education and training those capabilities require. Finally, this research examines the available education and training system for developing officers for AOC leadership positions.

As Figure 1 illustrates, airpower C2 historical concepts shape and define current AOC requirements; AOC requirements drive development of education and training; education and training directly influence the way in which airpower is executed. Operational execution then supplies feedback that initiates, reinforces, or dismisses historical concepts, thus continuing the development cycle.

DEVELOPMENTAL PROCESS CYCLE

HISTORICAL CONCEPTS → AOC CAPABILITIES → TRAINING & EDUCATION → OPERATIONAL EXECUTION

FEEDBACK
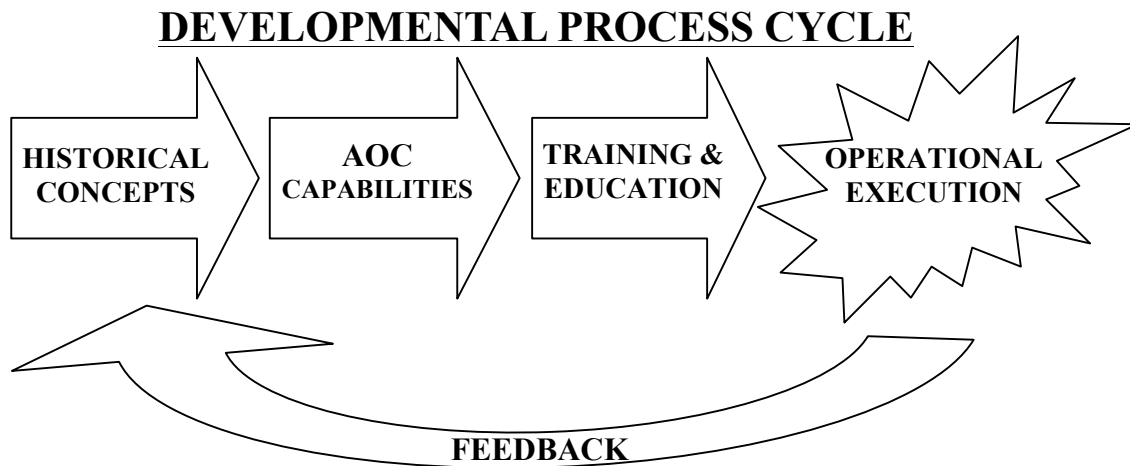
Figure 1

Based on this developmental process, this study first traced the historical evolution of airpower C2 concepts beginning with World War I. The airpower concepts derived from the experiences of the First and Second World Wars helped to form the characteristics that led to the Air Force gaining independence as an equal arm of the US military. The Korean and Vietnam Wars provided airpower leaders with further experience that enhanced previous concepts and provided new areas in which to improve. However, as the historical research began analyzing recent airpower operations (Gulf War to present), a considerable number of new lessons began to surface.

The Gulf War became a virtual classroom for new ideas about strategic planning, effects based targeting, and most importantly, the need to formalize the personnel, technology, and processes required for effective airpower C2. Fortunately, the President, Secretary of Defense, and the Gulf War's Joint Force Commander (JFC) allowed airpower the autonomy to plan and execute the war under the authority of a single airpower expert—the Joint Force Air Component Commander (JFACC). Although there was considerable contention and bickering among the services and coalition partners regarding the "command authority" of the JFACC, airpower managed to retain the degree of independent decision-making authority required to execute the most successful air war in history. Following the Gulf War, a concerted effort to develop, maximize, and organize airpower C2 effectively resulted in initiatives that significantly improved

airpower's operational capabilities. Many of the lessons that came out of the Gulf War became the building blocks for the development and official adoption of the AOC as the formal vehicle for airpower C2.

By the time Allied Force began, the AOC was a functional and formalized structure for planning and executing the projection of theater-wide airpower. Although the personnel, technology, and processes associated with the AOC for Allied Force still required further refinement, the AOC nonetheless provided exceptional airpower C2 capabilities. The AOC in Allied Force proved to be an effective and efficient vehicle for managing and executing airpower operations across the theater.

Several questions that directly affect airpower C2 continually surface. At what level of leadership should we draw the line between centralized control of airpower and decentralized execution? What level of airpower expertise should be mandatory in order to have decision authority in an air war? Should we appoint an airman (airpower expert) the JFC or give the JFACC final authority over airpower execution if the principle military arm in a war is airpower? The consideration of these important questions together with the initial intentions of this research made it clear that there are considerable aspects for further study in regards to effective airpower C2. However, of specific focus of this study is how the Air Force can best prepare officers to meet AOC leadership requirements.

STUDY OUTLINE

In order to effectively compare and determine if the historical concepts of airpower C2 are sufficiently incorporated into today's AOC, historical lessons are presented under three categories: personnel, technology, and processes. Chapter 2, Historical Precedent, concludes with a table summarizing the airpower C2 this study identified within the personnel, technology, and processes framework. Using the same framework, chapter three, Air Operations Center, presents the current capabilities of today's AOC for a comparison with the historical concepts in chapter two. The comparison shows that today's AOC sufficiently incorporates the enduring airpower C2 concepts developed throughout history.

Chapter four, Airpower Leaders, presents the current education, training, and exercises available for the development of potential AOC leaders. Analysis of the current opportunities reveals three major successes, and four major concerns. Chapter four relies heavily on primary information gathered from nearly twelve hours of recorded interviews with senior officers experienced in AOC operations. Finally, chapter four concludes by offering several recommendations for proactively addressing each concern and ultimately how the Air Force can best prepare officers for AOC leadership positions. Chapter 5, Conclusion, summarizes the study and offers questions and ideas that require further research.

The conclusions of this research will not surprise those who are currently operating, educating, and developing AOC personnel, technology, and processes. The value of this research lies in its unbiased investigation—conducted from outside the current AOC infrastructure. Identifying the successes and problems within the current AOC leadership development system offers AOC planners further guidance and subsequent direction. Having no institutional or personal agendas, this work may offer AOC developers support for their emerging ideas, and possibly reinforce struggling initiatives yet unaccepted.

Chapter 2

Historical Precedent:

Tracing the Evolution of Airpower Command and Control Concepts

From Plato to NATO, the history of command in war consists essentially of an endless quest for certainty—certainty about the state and intentions of the enemy's forces; certainty about the manifold factors that together constitute the environment in which the war is fought, from the weather and terrain to radioactivity and the presence of chemical warfare agents; and, last but definitely not least, certainly about the state, intentions and activities of one's own forces.

— van Creveld in *Command in War*

Throughout the history of warfare, the lessons learned following major conflicts have helped to shape the thinking and subsequent preparation for future battles. From the earliest applications of airpower in war, airmen began to develop concepts governing its effective C2. From the lessons learned in World War I to the recent conflict in Afghanistan, airpower advocates have continually refined airpower C2 requirements. This chapter presents historical evidence to support the argument that today's airpower C2 requirements are relevant, necessary, and the result of nearly 100 years of insights derived from continually developing airpower concepts.

This work uses three predominant categories of airpower C2: personnel, technology, and processes,[1] and concludes by synthesizing the overarching historical insights gleamed from airpower lessons learned. These three categories, and their associated characteristics, form the basis for evaluating current airpower C2 capabilities. This chapter is the first step in determining how the Air Force can best prepare officers to meet AOC leadership requirements. The historical evolution of airpower C2 establishes a precedent, which in turn forms the foundation for current AOC requirements and capabilities. The relevance for current C2 requirements is determined by comparing the enduring lessons learned in this chapter against the current capabilities of the AOC in chapter three.

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[1] Air Force Doctrine Document (AFDD) 2, *Organization, and Employment of Aerospace Power*, 17 February 2000, 2.

WORLD WAR I

Air Force doctrine states "[airpower] C2 is an essential and integral part of warfighting that requires careful planning and execution to be effective."[2] The requirement for "planning and execution" is the result of numerous lessons learned from airpower operations in war—beginning with World War I.

In World War I, airpower C2 was in its infancy. Most Army leaders believed there was little difference between C2 of the ground and C2 of the air.[3] However, in terms of personnel and processes, Army aviators soon realized that C2 of the air required new thinking—uniquely different from its land and sea counterparts. In terms of technology, unlike most other weapon systems, the airplane could be used for multiple purposes: visual and photographic reconnaissance, artillery adjustment, infantry liaison, counter air operations, bombing and strafing in close support of ground forces, and interdiction of enemy lines of communication.[4] The need to develop an organizational system to manage effectively the rapidly growing requirements of airpower personnel, technology, and processes, soon became apparent. From this, airpower advocates came to believe that airpower required a unique "airman's perspective" in order to ensure its proper use; in World War I, the air Battle of St. Mihiel provided evidence and operational experience that further supported this assertion.[5]

The Battle of St. Mihiel was the largest use of coordinated airpower ever committed in World War I, providing clear lessons on the employment of military airpower. With over 1500 American and Allied aircraft, Col William "Billy" Mitchell set out to develop the battlefield plan for the employment of airpower.[6] Mitchell implemented several new organizational elements for the control and employment of airpower. First, he took control of all the planning and subsequent operations of aircraft at St. Mihiel. This allowed ground commanders to have one point of contact in planning and developing how they would use airpower. It also allowed him to organize and plan

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[2] Ibid., 1.

[3] Mauer Mauer, ed., *The U.S. Air Service in World War I*, *Vol II*, (Washington: The Office of Air Force History, 1978), viii.

[4] Ibid., vii.

[5] Ibid., viii.

[6] Mauer Mauer, ed., *The U.S. Air Service in World War I*, *Vol III*, (Washington: The Office of Air Force History, 1979), iii, and Document 11, 60-61.

how best to meet the ground commanders' requirements without having to compete with other airpower commanders for control.[7] Second, airpower had the latitude to accomplish strike missions that did not directly support ground operations, but had strategic level objectives "far from the battlefield."[8] Third, airpower operations were pre-planned and fully coordinated in the greatest of detail to include: daily instructions, organization and chain of command, liaison procedures, artillery communication operations; pursuit, bombardment, and reconnaissance procedures; methods for assigning missions, intelligence gathering/disseminating procedures, and prescribed duties for various aviation commanders.[9] History records that the "US offensive [at St. Mihiel], gained all its objectives quickly and with relatively few casualties."[10] Furthermore, the personnel (Mitchell)*,* technology (numerous mission capabilities of aircraft)*,* and processes (overall campaign plan and organization for battle), of airpower played a major role in the overall success at St. Mihiel. In a congratulatory letter to First Army Air Service (the air arm at St. Mihiel), the commanding officer, General Pershing, praised the airmen for the "successful and very important part" they had played in the battle.[11]

The Battle of St. Mihiel, and World War I in general, taught airmen several enduring lessons. Robin Highman's chapter, "Air Power In World War I, 1914-1918," draws the following conclusion:

> The Great War in the air exhibited traits and trends that would be evident in the subsequent evolution of this highly technical, consuming, new military arm. It did then, and continues today, to require very skilled professional management to make it efficient.[12]

The "traits and trends" and "highly technical, consuming" nature of airpower, supports the idea that leaders require unique education and training in order to C2 airpower effectively in war.

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[7] Mauer Mauer, *The U.S. Air Service in World War I, Vol III*, v. Mauer, *The U.S. Air Service in World War I, Vol II,* viii-ix.

[8] Mauer, *The U.S. Air Service in World War I, Vol III*, Document 7, 53.   Mauer, *The U.S. Air Service in World War I, Vol II,* viii.

[9] Mauer, *The U.S. Air Service in World War I, Vol III,,* Document 6, 16-51.

[10] Ibid., iii.

[11] James J. Hudson, *Hostile Skies: A Combat History of the American Air Service in World War I* (Syracuse, N.Y.: Syracuse University Press, 1968), 186.

[12] Robin Higham, "Air Power In World War I, 1914-1918,*"* in *The War In The Air 1914-1994*, ed. Alan Stephens, et al. (Fairbairn, Australia: Air Power Studies Center, 1994), 24.

WORLD WAR II

The years that followed the Great War brought tremendous change to both the development and the importance of airpower in war. Airpower advocates' outspoken appeal for the efficacy and advancement of airpower as an equal to other military arms, stimulated the establishment of the Army Air Corps—"Mitchell was of course the leading visionary."[13] In 1935, the Army Air Corps (promoted from the Army Air Service in 1926) won the development of the General Headquarters Air Force; organizing all operational units under one command.[14] Although the formal establishment of the Army Air Corps and the General Headquarters Air Force fell short of a separate Air Force, it afforded airpower leaders greater autonomy to operate, plan, and develop airpower processes. The establishment of the Air Corps Tactical School (ACTS) at Langley Field, Virginia (later moved to Maxwell Field),[15] enabled airmen to further codify their ideas into doctrine and begin formally educating personnel. Of over 1091 students who graduated form ACTS, nearly 25 percent of them became general officers in World War II (11 of the 13 three star generals and all three of the four star generals).[16] Michael Sherry in, *The Rise of American Airpower*, summarizes the thinking and subsequent doctrine that came out of the ACTS:

> The Air Corps Tactical School had established a body of literature and a tradition of theorizing about aviation…. The new doctrine of precision bombing was the product of their efforts and the vehicle of their ambitions. Briefly, airmen, especially at the tactical school, argued that strategic airpower could contribute to victory or secure it by attacks on the enemy state, especially its economic institutions. These attacks need not be indiscriminate, indeed should be targeted at only a few key components

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[13] James P. Tate, *The Army and its Air Corps: Army Policy toward Aviation*, (Maxwell Air Force Base, Alabama: Air University Press, 1998), 2.

[14] Michael S. Sherry, *The Rise of American Airpower*, (New Haven, CT.: Yale University Press, 1987), 48-49.

[15] "Located at Maxwell Field from 1932 to 1942. Formally known as the Air Service Field Officers' School, it was established at Langley Field Virginia, when the Army Air Corps replaced the Air Service under the Air Corps Act of 1926. It was moved to Maxwell in 1932 and became the Army Air Forces of Applied Tactics in 1942. It became part of Air University in 1946." *The Oxford Essential Dictionary of the U.S. Military*, 2001, 8.

[16] Lt Col Peter R. Faber*, "Interwar US Army Aviation and the Air Corps Tactical School: Incubators of American Airpower," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Col Phillip S. Meilinger, (Maxwell Air Force Base, Alabama: Air University Press, 1997), 212.

whose destruction would disrupt the functioning of the entire state. The enemy's will or capacity to fight would then collapse.[17]

The idea of "strategic airpower" dominated the thinking of Army Air Corps leaders. Although airmen continued to debate and develop several airpower functions, strategic bombardment took center stage as America entered World War II.[18] Moreover, the doctrine of strategic bombardment required that specific bomber technology be further developed and funded. In the years between World War I and World War II, leaders realized that airpower C2 required new thinking in the areas of personnel, technology, and processes.

While World War II lessons learned would further reinforce many of the previous airpower beliefs, new airpower experiences would develop C2 requirements that have endured to this day. An examination of the airpower operations in North Africa and the bombing raids conducted over Europe help to illustrate several important lessons learned.

Despite the lessons of World War I, and the gains made during the inter-war years, flawed airpower organization characterized the initial use of airpower in North Africa.[19] The official Army doctrine (Army Field Manual 1-5) spelled out that an air arm be attached to every major ground formation and subsequently remain under the authority of the ground commander, "who had the more important mission." Furthermore, "there was no centralized control of either the tactical or strategic air forces." This doctrine all but eliminated the priority to gain air superiority over the battle space. Unfortunately, the idea that airpower's first mission would be to provide "cover" to ground troops in combat proved a major mistake. German fighters massed their resources and overwhelmed Allied aircraft—making losses prohibitive.[20] It became apparent to both ground and air leaders that air superiority was required before air forces could effectively support ground forces.

The Casablanca Conference in January of 1943 officially reorganized airpower in the Mediterranean theater under one commander, Air Marshal Tedder. Under Tedder and

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[17] Sherry, 50.
[18] Alan Stephens, "The True Believers: Air Power Between the Wars" in *The War In The Air 1914-1994*, ed. Alan Stephens, et al. (Fairbairn, Australia: Air Power Studies Center, 1994), 57-58.
[19] William W. Momyer, *Airpower in Three Wars (WWII, Korea, Vietnam),* (Washington D.C.: U.S. Government Printing Office, 1982), 40.
[20] Ibid., 40.

his immediate vice-commanders (Gen Spaatz and Air Vice Marshal Coningham), Allied air forces could be concentrated and prioritized based on theater-wide requirements—the highest of which was air superiority. Tedder refused to parcel out airpower; rather, he diligently organized a comprehensive air campaign that addressed both tactical and strategic objectives.[21] According to retired General William Momyer, "The unity of airpower [after Casablanca] was not only sound in theory, but the theory stood the test of battle and proved to be the most effective method for the C2 of airpower in a theater operation."[22] Centralized control and theater-wide campaign planning under an experienced airman again proved to be enduring requirements for airpower C2; however, the skies over Europe had additional lessons to teach.

The European bombing campaigns in World War II have had perhaps the most published attention of any airpower activity. The immortalized words of the former British Prime Minister, Stanley Baldwin, characterized the thinking process of Allied airpower over Europe: *"...the bomber will always get through."[23]* An argument that the bombers did indeed always get through is easily made—but at what cost? Some casualty figures approximate the absolute loss of bomber crewmen to be nearly 50,000 United States Army Air Force and 50,000 Royal Air Force.[24] These loss rates have prompted continuous debate (often heated) about how the bombing campaign over Europe might have been more effectively and efficiently accomplished. Of the most common topics discussed (and the most elusive to common answers) are ideas about escort, precision capabilities, and target selection.

Airpower advocates prior to World War II believed a bomber, properly built with defensive capabilities, would be able to sufficiently defend itself—without escort—on offensive bombing missions; the development of the B-17 "Flying Fortress" is evidence of this belief.[25] Unfortunately, bomber crewmen found themselves the easy targets of faster, more maneuverable German fighters. Based on the devastating losses experienced

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[21] Ibid., 43-45.
[22] Ibid., 45.
[23] Max Hastings, *Bomber Command*, (New York: Dial Press, 1979), 43.
[24] Richard Overy, *World War II: The Bombing of Germany*, in *The War In The Air 1914-1994*, ed. Alan Stephens, et al. (Fairbairn, Australia: Air Power Studies Center, 1994),114. In his footnote, Overy explains that the Figures are approximate, at best, due to a number of accounting problems. This seems to explain his use of the word "absolute."
[25] Richard Overy, *Why the Allies Won*, (New York: W. W. Norton & Company, Inc., 1995), 114-115.

over Europe, most B-17 crewmembers did not believe they would live to accomplish the minimum thirty sorties.[26] Why bombers failed to have fighter escort to and from targets has several possible answers. The most obvious is that the airpower leaders' belief in the "self-defending bomber" discouraged the development of fighter aircraft with the required range to accompany bomber formations effectively.[27] In this case, improved fighter technology might well have made the difference for the nearly 100,000 bomber crewmen who lost their lives.

The ability of Allied bombers to strike their targets has been yet another point of considerable contention. The percentage of bombs dropped that actually hit their intended targets was a level of magnitude less than airpower advocates had asserted it would be.[28] Some suggest that the lack of precision capabilities forced the British into a doctrine of area bombing—a doctrine that potentially killed more non-combatants than combatants.[29] The ability to successfully strike desired targets is a fundamental requirement for the doctrine of strategic bombardment. Max Hastings has concluded, "…for all the technology embodied in the bomber aircraft [by the end of the war], its load once released was an astonishingly crude and imprecise weapon."[30] Subsequently, the technology needed to support the desires of airpower visionaries became of first importance in the years that followed World War II. The debate over fighter escorts and precision bombing capabilities both draw similar conclusions—technology in war matters and must be exploited to maximize operational effectiveness.

Finally, the question that continued to elude consensus (and has even to this day) was what targets should be hit and when? A new degree of analysis began to emerge across the map of Germany and her occupied territories. Airmen, together with intelligence and industrial experts, sought to determine the strategic targets whose

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[26] This was expressed by Grover Barnett, a B-17 turret gunner on B-17s in World War II. He successfully accomplished thirty bombing missions before being released to come back to the states. His crew was the only crew of 25 in his initial squadron that returned home from World War II. The number of missions went from 25 to 30 on the direction of Gen Spaatz.

[27] Stephens, 62-63.

[28] Stephens 61-65. "…of those aircraft recorded as having attacked their target, only one in three had in fact been within five miles."

[29] Richard G. Davis, *Carl A. Spaatz and the Air War in Europe*, (Washington D.C.: U.S. Government Printing Office, 1993), 564. Robert A. Pape, *Bombing to Win: Air Power and Coercion in War*, (Ithica N.Y.: Cornell University Press, 1996), 261. David Boyle, *World War II*, (London: Barnes and Noble Publishing, 1998), 172-185. This is one of several reasons why the British went to night bombing.

[30] Hastings, 351.

destruction would cripple Germany's ability to continue waging effective war. While the Americans attempted to destroy German industry by targeting its industrial web, the British began area bombing to disrupt the morale of the German people.[31] Although analysis of the success of either strategy has produced diverging opinions, one lesson can be drawn with little disagreement—the processes of choosing targets for the desired effect is extremely important and equally difficult. Although the lessons learned from World War II regarding personnel, technology, and processes, would help to shape future airpower C2, two major wars would still be waged before these enduring lessons became fundamental, standardized requirements.

KOREAN WAR

The lessons learned during World War II regarding airpower C2 were not forgotten; yet the Korean War shows that there was little agreement between the services as to how those lessons should shape operations.[32] Following World War II, the United States Air Force gained its independence as a separate arm of the military (18 September, 1947). Although this "new freedom" allowed greater flexibility in the development of personnel, technology, and processes, it also developed an entirely new challenge for airmen—coordination of their independent ideas and operations with the other services.[33] Korea would prove to be a classroom for C2 of joint airpower operations.

On 25 June 1950, a massive attack by the North Koreans started a war that would last three years and end with a divided Korea that has lasted nearly fifty. Going into the Korean War, the newly independent US Air Force had adequate personnel and technology, but lacked coordinated unity of command (processes) with the other services. An established "coordination control" agreement for Korea was designed to focus effectively airpower across the theater of operations; however, the Navy chose only to see

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[31] Pape, 260-263.

[32] James A. Winnefeld and Dana J. Johnson, *Command and Control of Joint Air Operations*, (Santa Monica, Ca.: RAND Publications, 1991), 24.

[33] Ibid., 24. In Winnefeld's footnote, he uses as evidence the "Revolt of the Admirals." This is one of many points that show the rivalry between services regarding roles and missions. Excellent documentation regarding pre-Korean War inter-service discourse can be found in Herman S. Wolk, *The Struggle for Air Force Independence: 1943-1947*, (Washington D.C.: Office of Air Force History, 1984), 178-185.

the word "coordination," while the Air Force saw only the word "control."[34]   In regards to the coordination control directive for Korean air operations, Robert Futrell writes:

> Hardly was this directive issued than Air Force officers discovered that the magic formula of "coordination control" had no officially assigned meaning. It meant one thing to FEAF [Far East Air Forces] and quite another thing to NavFE [Naval Forces Far East], and, although asked to give some clarification, CINCFE [Commander-in-Chief Far East] never saw fit to explain just what "coordination control" did mean. Time itself would give some meaning to the newly coined phrase, but until it did so there would be differences of opinion, misunderstandings of channels of communications, and disagreements over the wordings of important operations orders.[35]

As the war progressed, the Navy would only participate in air operations when it believed the operation fit into its own battle objectives.[36] However, the lack of centralized control and neglect of unity among airpower leaders improved with the emergence of the Joint Operations Center (JOC).

The JOC was formed in Korea as early as July of 1950; although numerous communication and doctrinal problems kept it from being immediately effective, the JOC eventually became an important airpower C2 center. The "center was intended to facilitate the coordination of air and ground operations in the theater."[37] Close air support characterized much of the air operations in the Korean conflict; the JOC's intended design was to control that process. Once again, however, there were considerable differences between what the Navy believed "close air support" meant and subsequently required, and what the Air Force believed it meant.[38] The demands of war were often over-shadowed by the continued disagreements over service roles and missions.

In spite of fevered discourse, competing agendas, and inter-service power plays, in the end, airpower was able to meet the needs of battle in Korea effectively. The message that the Korean War sent loud and clear is that theater-wide airpower C2 processes, formalized, and accepted across all the services, are paramount to effective

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[34] Momyer, 57-59.
[35] Robert F. Futrell, *The United States Air Force in Korea*, (Washington D.C.: Office of Air Force History, 1983), 50.
[36] Winnefeld, 27.
[37] Ibid., 27.
[38] Futrell, 704-708.

and efficient operations. In the years ahead, coordination among services would slowly improve; however, far greater concerns would erupt when airpower C2 fell victim to "centralized execution."

THE COLD WAR AND VIETNAM WAR

After the end of the Korean War in July 1953, American military forces entered a time of peace. However, the lack of war did not keep the United States, and especially the Air Force, from making tremendous changes in the role airpower would play in future wars. The Cold War was now in full swing and the development of a strategic C2 system would rapidly emerge. However, the airpower C2 system formulated specifically to meet the threat of the Cold War would find its way to the remote jungles of Vietnam—an environment not anticipated nor conducive to US airpower C2 procedures.

The personnel, technology, and processes associated with "nuclear" airpower C2 took on very specific and unique characteristics. Under the leadership of Curtis LeMay, the Air Force established itself as a strategic force with clear and direct lines of C2.[39] With the rising threat of the Soviet's nuclear capabilities, the requirement for heightened and unambiguous procedures for US airpower C2 developed twenty-four hour bomber and tanker crew alert, continuous airborne C2, and quick response execution procedures to launch nuclear arsenals.[40] These required processes influenced the direction and achievements in technology, and subsequently, the education and training of personnel.[41]

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[39] Curtis LeMay took command of Strategic Air Command on 19 October 1948, and remained until 30 June 1957. His position as SAC commander was the longest of any military force commander since General Winfield Scott. Although there is much documentation covering the events of SAC from 1947 through its demise in 1991, see Walter Boyne, *Beyond the Wild Blue: A History of the U.S. Air Force 1947-1997*, New York, N.Y.: St. Martin's Press, 1997), 96-133, for an easy to follow and well written examination. Boyne's account of LeMay and his effect on SAC is characteristic of most documentation and highlights the tremendous impact LeMay and SAC had on US military policy and C2 in general.

[40] Boyne, 96-133.

[41] The majority of all the aircraft procured during this time revolved around the nuclear strike mission. Fighters were designed to carry small nuclear weapons at high speeds or to escort the heavy bombers to their targets. Air refueling became paramount to increase the range of aircraft to around the world. The number of aircraft in SAC in 1948 was 837, and by 1957, that number had risen to 3,040. This however does not tell the whole technology story. The aircraft in 1948 were prop driven World War II vintage; the aircraft in 1957 were jet aircraft with all weather, day/night, secure communication capabilities. The leap in military aviation technology was exponential over this 10 year period. As far as personnel were concerned, the bomber and missilear career fields garnished considerable attention in education and training procedures. LeMay knew that all SAC's technology and processes were dependant on a highly developed personnel force to carry out directives effectively. The bottom line during this time was that everything revolved around the nuclear mission— personnel—technology—processes. See Boyne, 96-133.

Of perhaps greatest importance, however, is the relationship that the president and his immediate advisors developed with the execution processes.

Because nuclear war had national survival ramifications, the president, his administration, and the military services together developed the Strategic Integrated Operational Plan (SIOP) for countering/engaging the Soviet Union in a nuclear war. All details of the plan had to pass approval at the presidential level (which aircraft would launch, what bases would be involved, identification of specific targets, and unambiguous launch authority/procedures). Throughout the 1950s and into the 1960s, the C2 of airpower forces had developed a system that could execute within minutes of a presidential order. The execution processes from the president to the operator were short and intentionally designed to prohibit intervention along the path by military or civilian subordinates.[42] Within this framework of technology and processes, the United States entered into a conventional war in Vietnam.

By the time the United States became committed to combat in Vietnam, there had already been "…a revolutionary explosion of electronic communications and automatic data processing equipment, which made effective worldwide C2 from Washington a practical technological proposition."[43] This technology, together with the established Cold War C2 system, resulted in President Johnson selecting and planning daily airpower targets and operations from Washington. During his Tuesday White House luncheons, the president made operational and tactical level decisions based on his political agenda. Although the president included most of his top advisors in these luncheons, the military was not invited nor represented until late in 1967.[44] This process of micro-managing the war from Washington frustrated Air Force leaders in Vietnam who believed that all of the lessons gained from previous wars had been forgotten, or worse, ignored. Although there is continued debate as to what the United States may have done differently in Vietnam to produce a better outcome, most airmen agree that airpower would have been much more effective under the principle of centralized control and decentralized execution. The

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In terms of technology, see Martin van Creveld, *Command in War,* (Cambridge, Mass.: Harvard University Press, 1985), 234-237.
[42] Creveld, 234-237.
[43] Creveld, 236.
[44] Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam* (New York: The Free Press, 1989), 84-85.

centralized control and *centralized* execution experienced by airman in Vietnam goes to the heart of what has become a common and often passionate statement when planning for current war—*this will not be another Vietnam!*

Although the lesson of having airpower C2 processes that properly delegate execution authority down to operational and tactical commanders is the most striking, lessons regarding technology and personnel were also important. The need for aircraft technology specifically developed for conventional war, let alone guerrilla war, was lost in the myopia of the Cold War. Furthermore, airpower personnel that had spent most of their careers learning and preparing to engage the Soviet Union in a nuclear battle, found themselves unprepared to plan and wage a war of counter-insurgency against a virtually unknown and misunderstood enemy.

The conceptual lessons airpower C2 leaders gained from the Vietnam experience were extremely important and played a major role in the subsequent development (redevelopment) of personnel, technology, and processes that followed the war. For all that went wrong in Vietnam, there were also lessons learned from successful operations. The creative and flexible application of airpower by airmen who understood its strengths and limitations (personnel);[45] the need to continue development of precision munitions based on the success of strikes using laser guided weapons (technology);[46] and the successful coordination and integrated packaging conducted between Air Force and Navy assets (processes);[47] clearly showed that airpower had come a long way since the Korean War. Although airpower leaders do not look upon the Vietnam experience as favorable, the lessons of Vietnam (both good and bad) would help to prepare airpower C2 personnel, technology, and processes for a future storm in a distant desert.

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[45] There are numerous examples of the ingenuity and creative thinking accomplished by airmen in Vietnam. One example can be found in the study of Operation Bolo. Bolo could not have been accomplished had it not been for airmen (Col Olds) having the knowledge of the strengths and limitations of airpower. In fact, Bolo shows that airmen also had a solid understanding of the capabilities of the enemy aircraft as well. For an excellent account of Operation Bolo, see Momyer, 145-146.

[46] Momyer, 149.

[47] Winnefeld, 51.

GULF WAR

On 15 August 1973, the last bomb run over Vietnam was complete—marking an end to the longest war in US history.[48] Without exception, all of the US military services had fought a war for which they were unprepared. Each service fought with honor despite political, social, and military confusion. Following the Vietnam War, each service would reflect on the lessons they had learned and prepare for the next time their country would call them to arms—the United States Air Force was no exception. Fortunately, it would be nearly eighteen years before another major American war checkered foreign skies.[49]

In August of 1990, following Iraq's advance into Kuwait, American and coalition forces began massing forces to restore Kuwait and bring stability to the Middle East region. However, "For the first time in the history of American airpower, airmen found themselves the principle players going into war."[50] The lessons learned in the months that followed would not only change the world's perspective on airpower, but would affect to this day the required development of airpower C2 personnel, technology, and processes.

In the six-month period from August 1990 to January 1991, the US military force in the Middle East grew under the banner of Operation Desert Shield. The force buildup by the United States was nothing less than impressive, sending a clear signal to Suddam Hussein, and the rest of the world, that the US response was serious.[51] During Desert Shield, airlift operations provided a rapid response and set the pace for the remainder of the war. The immense requirements of Desert Shield illustrated the continued necessity for advanced global airlift technology and an integrated management system capable of planning, tracking, updating, and responding to the high demands expected from airlift.

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[48] Herman L. Gilster, *The Air War in Southeast Asia: Case Studies of Selected Campaigns*, (Maxwell Air Force Base, Alabama: Air University Press, 1993), 3.
[49] There were several conflicts in which America provided military support prior to the Gulf War: 1973 Arab-Israeli War, Operation Desert One, Gulf of Sidra, Falklands, Bekaa Valley, Beirut, Grenada, Operation Prairie Fire, Operation Eldorado Canyon, and Operation Just Cause. This study acknowledges these conflicts and gives the highest of honor and respect to the warriors who fought and died. However, within the scope of this research, the Gulf War will shed the greatest amount of lessons and is presented as the next "major" war following Vietnam.
[50] Major General Deptula, United States Air Force, interviewed by author, 31 January 2002.
[51] Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey*, (Washington D.C.: 1993), 4. "By the end of the war, more than 3,800 US fixed- and rotary-winged aircraft, 500,000 personnel, and almost 3 million tons of cargo had arrived in theater."

Desert Shield provided the means to wage war, possibly deterred Iraq from crossing more borders, and bought the US enough time to plan its first combat move—Desert Storm.[52]

For the US Air Force, Desert Storm provided the opportunity to apply the strategic bombing concepts that, in part, had originated at the ACTS over fifty-years prior.[53] However, the Air Force of 1991 had a number of arrows in its quiver not dreamed of in the 1930s. Stealth technology, precision munitions, advanced space assets, and secure global communications, gave airpower planners all the tools required to execute an effective air campaign. How well airpower personnel, technology, and processes could formulate strategy, develop objectives, and command joint and coalition airpower throughout the theater, was yet untested. Following the successful conclusion of the Gulf War, airpower post-war assessments documented a number of findings requiring subsequent attention.[54]

General Schwarzkopf's (Joint Force Commander) decision to appoint a single airman to control air operations across the theater helped contribute to the overwhelming success of airpower in the Gulf War. The appointment of Lt Gen Charles A. Horner as the Joint Forces Air Component Commander helped promote centralized control of theater-wide airpower and establish greater unity of effort between American and coalition airpower forces.[55]

> General Horner assumed operational duties as the area Rear Air Defense
> Coordinator, the Airspace Control Authority, and the Joint Force Air
> Component Commander (JFACC) responsible for planning, coordinating,
> allocating, and tasking theater air operations derived from General
> Schwarzkopf's apportionment decisions. Horner exercised his authority
> through the daily Air Tasking Order (ATO), which provided detailed

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[52] For a detailed, yet concise, presentation of Operation Desert Shield, see Robert F. Dorr, *Dessert Shield: The Build-up: The Complete Story,* (Osceola, Wisconsin: Motorbooks International, 1991). For primary source and personal accounts of the dynamics and complexities of Desert Shield, see *From The Line In The Sand*: *Accounts of USAF Company Grade Officers in Support of Desert Shield/Desert Storm,* ed. Capt Michael P. Vriesenga, (Maxwell Air Force Base, Alabama, Air University Press, 1994).

[53] There were several differences, however, between the Gulf bombing plan and those suggested at ACTS. Keaney points out in the Gulf War Air Power Survey, "…the short, intense air campaign of the Gulf War had different emphasis than did the air power prophecies of the 1920s and 1930s [ACTS]. In contrast to attacking the industrial production that in past wars had provided the arms and munitions for forces in the field, the Desert Storm air campaign sought preeminently to disorganize the "central nervous system" of the enemy regime. 236.

[54] Keaney, 1-235.

[55] Ibid., 159.

direction, with some exceptions, for all coalition flight operations during both Desert Shield and Desert Storm.[56]

However, this position and subsequent authority was yet untested in a war of this size. The services and coalition forces accepted the need for "coordination" of the 2,000 to 3,000 aircraft sorties flown per day in theater, but had reservations as to "General Horner's authority to select the targets and prescribe the flight operations for the many elements of the [services and] coalition air forces."[57] Although the lesson of putting all theater airpower under a single airman had been implemented, there existed a lack of formalized command authority and agreed upon roles and missions among service and coalition airpower leaders.[58] This suggests again the need to formally define lines of authority for airpower C2 personnel and processes in joint and coalition operations.

The pre-war processes required to effectively develop a comprehensive, offensive air campaign were inadequate. There were never any deliberate plans developed before the war that used airpower for anything other than defensive operations: holding back the enemy "until large ground forces could arrive."[59] The Gulf War Air Power Survey suggests the following pre-war planning environment:

> Pre-August 1990 planning for the Persian Gulf, as most regions, concentrated on the requirements for deploying forces over vast distances. Planners thought more about the means of moving the fighting and logistical units to the theater—a vast task—than about the tasks of the units once they got there.[60]

This lack of pre-war planning for airpower as a principle offensive player in the war forced the Air Force to scramble in order to assimilate personnel able to develop a coherent, comprehensive plan. "Furthermore, much of the Desert Storm air plan emerged from planning prepared by special and ad hoc organizations, whose existence no one had anticipated before the war."[61] Col John Warden and his staff in Washington played a

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[56] Ibid., 5.
[57] Ibid., 5.
[58] Keaney, 145-146, 159-161. There were several aspects of airpower in theater over which the JFACC did not have authority. Gen Horner himself turned over operations in northern Iraq to another airpower commander in order to focus all his time in the south where operations were extremely active and flying volume was highest. The Marines kept most of their air assets, and the Navy kept all they wanted for fleet defense operations.
[59] Ibid., 28.
[60] Ibid., 29.
[61] Ibid., 35.

large part in developing the initial draft, Instant Thunder, but further refinement by personnel in the ad hoc group called the "Black Hole" accomplished final development.[62] Gen Horner, using personnel that had no pre-war training together, and no formalized doctrine in which to organize, assimilated the Black Hole. After the Gulf War ended, the Black Hole literally disappeared.[63]

When it came down to gathering the right mix of experts to plan and execute the war in what would become the AOC, Gen Horner shares the following:

> The success of the AOC during Desert Storm, in large measure, can be laid to the fact that we had a large number of officers at the end of their career. *During peacetime, they were hard to find* in their offices when no real work needed to be done, but they had pride and when the war came along they served with zeal. Because they had spent years in the same job (*they were passed over so they were relegated to a pasture job at 9th AF pending retirement*), they had the experience to set up and operate an AOC. I augmented this core staff with bright and shiny officers and NCOs drawn from other jobs….[64]

General Horner's testimony points out that assembling personnel to "set up and operate" the AOC was anything but a formalized process. He recounts that the personnel were diligent in their abilities, but suggests that a single, integrated group of airpower C2 experts were not readily identifiable prior to hostilities. Unfortunately, there simply may not be six months to "setup" C2 operations, nor the luxury of developing an air campaign under non-combat conditions. This suggests that assimilating, developing, and evaluating airpower C2 personnel, technology, and processes during peacetime operations is paramount for a smooth and rapid transition into war.

Once the planners developed the target sets, mission details, and daily ATO, dissemination to service and coalition air forces followed. The daily ATO consisted of 200 to 800 pages of messages depending on the format. The ATO had every detail of the day's airpower operations down to the radio frequencies. Planners found the daily ATO

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[62] Keaney, 6, This describes how the "Black Hole" was developed, introduces Brig Gen Buster Glosson, and outlines the responsibilities of this "secretive" planning group. Although effective in their execution, this ad-hoc group was far from optimum, however, it has since been the basis for considerable development of AOC formalized requirements. (This information received from Maj Gen Deptula, interviewed by author. Gen Deptula was a Lt Col at the time and was part of the original five who started out in day one of the Black Hole.)

[63] Keaney, 247.

[64] Horner interview, italics added.

development and "dissemination to all units concerned a massive task."[65] Although in past wars, only partial tasking orders went out (applicable portions), the planners felt that the advent of linked computers allowed them to send the entire order. Unfortunately, the units receiving the ATO had limited printing capabilities, and some reported taking nearly five hours to download and print the document. In the case of the Navy, their data transfer equipment was simply not compatible with the planners' transmission software, forcing the ATO to be flown out to each ship on a daily basis.[66] In short, most operators considered the ATO too cumbersome and too slow to prepare. "After the war, one report of the Marine experience said that the ATO was an attempt to run a minute-by-minute air war at a 72 hour pace."[67] It became clear that future technology would have to ensure that ATOs be effectively and efficiently prepared, communicated, and disseminated.

The tremendous success of the space-based systems available in the Gulf War go a long way towards silencing the critics of military technology. The official Air Force survey concluded that, "Desert Storm was America's first *comprehensive* space-supported war."[68] Satellites provided precision guidance to aircraft munitions, weather forecasts for planning, secure global communication, and theater-wide imagery.[69] Additionally, in the Gulf War, space cells occupied key roles in the AOC. Although the success of space assets in the Gulf War highlighted their continued relevance, space technology may require additional considerations for C2. General Horner, speaking from his experience as both the JFACC in the Gulf War and Commander-in-Chief Space, shared the following comment regarding possible weaknesses in the AOC:

> First is the attempt to shoehorn "Space" into the AOC. *Space is so different from air operations* that it requires its own separate operations center. Putting space operations in the AOC can be accommodated but space is best planned in the United States, 12th AF or Cheyenne Mt. Take your pick. Moreover, space is of equal importance to land and sea operations as it is air operations and therefore there needs to be a separate Space Component Commander in theater with his own headquarters that is

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[65] Keaney, 5.
[66] Ibid., 149.
[67] Ibid., 150.
[68] Quoted in Richard P. Hallion, "Storm Over Iraq: Air Power and the Gulf War," (Washington: Smithsonian Institution Press, 1992), 313, from HQ USAF, *Air Force Performance in Desert Storm,* 10. italics added.
[69] Hallion, 313-317.

also closely tied to CINCSPACE [Commander-in-Chief], as many space operations will occur out of theater.[70]

Gen Horner's comment cautions airpower leaders that the capabilities afforded by space assets must be correctly managed and appropriately integrated into airpower operations. Additionally, space capabilities must also meet the demands of additional applications and services outside of the airpower arena. This may require unique space C2 procedures. In any case, the Gulf War taught airpower leaders that space capabilities are a necessity; and subsequently, future wartime applications require thoughtful development of space *personnel,* *technology,* and *processes.*

The overwhelming victory in the Gulf War was due in large part to the leaders who not only acknowledged most of the lessons of previous wars, but also ensured their implementation. The overarching lesson the Gulf War experience highlighted was that airpower C2 processes must operate under formalized procedures with clear lines of authority, be tailored to accommodate joint and coalition capabilities, and ensure theater-wide unity of effort. Although airpower performed remarkably well, the "ad-hoc" processes, and general lack of standard operating procedures, demanded the Air Force reevaluate its *personnel,* *technology,* and *processes* for airpower C2. The lessons learned form the Gulf War would later play a major part in the development of the AOC as a formal weapon system. Over the next ten years, and two additional air campaigns, airpower C2 within the AOC would vastly improve.

ALLIED FORCE

The North Atlantic Treaty Organization (NATO) began Operation Allied Force on 24 March 1999. The Federal Republic of Yugoslavia's unwillingness to cooperate or constructively negotiate, forced an international coalition air war to erupt in the skies over Serbia. Although the air war lasted only 78 days, the lessons for airpower C2 were both important and clear. Analysis of the Allied Force requires an examination not of one air war, but of two.

The historian John Keegan asserts there "were really two air wars, the first lasting a month, the second six weeks." He further suggests that the first air war was a failure,

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[70] Horner interview, italics added.

while the second was a success.[71] Ellwood Hinman, "Context and Theory: Lessons from Operation Allied Force," agrees with Keegan's assertion and further explains the position.[72] The first thirty days of Allied Force saw a gradual escalation of "tactical" airpower against mainly fielded forces. Milosevic (Yugoslav President) showed little reaction to the US led air strikes and continued his aggression into neighboring territories. The tactical and escalating strikes, however, were not the idea of airmen.

Lt Gen Michael Short, Allied Force's Combined Force Air Component Commander (CFACC), voiced after the end of the war that,

> [I] would have gone for the head of the snake on the first night. I'd have dropped the bridges across the Danube. I'd [have] hit five or six political headquarters in downtown Belgrade. Milosevic and his cronies would have waked [sic] up the first morning asking what the hell was going on.[73]

However, the first thirty days of air strikes did little to the industrial web or strategic infrastructure of the enemy. Although on paper the air war was under the authority of a single airman, General Short was not given the authority to fight the war he had been educated and trained to fight. Considerable disagreement between General Short and Army officer General Wesley Clark, Joint Force Commander (JFC), erupted over airpower C2. Although the AOC that ran the first thirty days of the air war performed extremely well, the more important aspect of airpower C2 leadership revolved around who had final authority for airpower, and to what degree should that leader be an airpower expert.

By 26 May, NATO political leaders concluded that the tactical escalating strikes were not having the effect they had hoped. Airpower planners received the green light to fight the air war based on the targeting and tempo established by the CFACC. The plan quickly shifted to strategic bombing of key military, production, transportation, and communication targets; Milosevic capitulated fourteen days later on 10 June 1999.[74] The official after action report summarizes the result of Allied Force:

> We forced Milosevic to withdraw from Kosovo, degraded his ability to wage military operations, and rescued and resettled over one million

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[71] John Keegan, "Please, Mr. Blair, Never Take Such a Risk Again," *London Daily Telegraph*, 6 June 1999, 1. As recorded in Ellwood Hinman "Context and Theory: Lessons from Operation Allied Force," *Air Power History,* Summer 2001, Vol. 48 Issue 2, 26.

[72] Hinman, 26.

[73] Robert S. Dudney, "Verbatim," *Air Force Magazine*, Dec. 1999, 58. As written by Hinman.

[74] Hinman, 29-31.

refugees. We accomplished this by prosecuting the most precise and lowest-collateral-damage air campaign in history-with no U.S. or allied combat casualties in 78 days of around-the-clock operations and over 38,000 combat sorties.[75]

In addition to ensuring that airpower execution is "decentralized" under the authority of a single airpower expert, Allied Force taught that coalition and allied air campaigns require a high level of integration for effective theater-wide operations. General Short commented that the most difficult thing he had to do, yet the most important, was to "coordinate with coalition forces." General Short shared that the relationships with coalition air forces were not mandatory based on combat requirements; rather, coalition partners' political support of the war often depended on their inclusion in the process. This taught General Short the importance of learning as much as possible about the allies you will be fighting along-side.[76]

Overall, allied Force was a successful post-Gulf War campaign that used airpower as the only principle player. This could not have happened without an extremely effective and efficient C2 airpower system in place. The airpower operations witnessed in Allied Force showed that the AOC had made significant improvements and advances since its infancy following the Gulf War.

CONCLUSION

The historical airpower C2 concepts continue to increase and evolve. Although some operations and subsequent lessons from one war do not necessarily apply to all future air conflicts, some concepts are universal and enduring. This historical C2 survey is the basis for determining if current airpower C2 capabilities effectively incorporate the universal enduring lessons of history. The next chapter provides the opportunity to determine the historical basis of current airpower C2, and subsequent relevance, by comparing the list of historical concepts developed in this chapter with current capabilities presented in the next. Determining the suitability (historical relevance) of

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[75] Secretary of Defense William S. Cohen and Chairman of the Joint Chiefs of Staff Gen. Henry H. Shelton, "Kosovo After Action Review", before the Senate Armed Services Committee, October 14, 1999.
[76] Lt Gen Michael Short, United States Air Force, conversation with the author in Washington D.C. during Future War Game.

current airpower C2 capabilities is foundational to further investigation regarding how the Air Force can best prepare officers for AOC leadership positions.

Figure 2 below presents the airpower C2 concepts developed over the last century and assimilated in this chapter. The concepts in Figure 2 are not all-inclusive and fall short of representing all possible historical C2 concepts; however, for the purpose of this research, they adequately reflect the major airpower C2 lessons learned.

HISTORICAL AIRPOWER COMMAND AND CONTROL CONCEPTS

PERSONNEL
- Airpower leaders must have expertise in American airpower capabilities and limitations
- Airpower leaders must understand the capabilities and limitations of coalition forces
- Airpower requires synergistic cooperation among all services (Joint)
- Airpower leaders must learn and understand the unique qualities of the enemy
- Airpower leaders must be flexible and able to adapt to an uncertain future
- Leaders must be fully qualified, educated, and train together during peace-time
- Personnel must be prepared to execute airpower as a principle force
- All joint airpower leaders must agree on formal airpower chain of command authority

TECHNOLOGY
- Airpower requires a variety of different aircraft to accomplish unique functions (full spectrum)
- Airpower technology must stay ahead of possible threats
- C2 centers must support all services (Joint)
- Airpower development must not be static, rather it should be dynamic and adaptable
- Airlift capabilities are paramount and require an integrated management system
- Air tasking orders require effective and efficient means of communication and dissemination
- Space capabilities must be fully exploited and integrated into operations

PROCESSES
- Airpower C2 must be under the authority of a single airman
- Airpower operations require detailed campaign planning
- Airpower missions must be prioritized with air superiority first
- Airpower planning requires a deliberate targeting selection system
- Airpower must have centralized control
- Airpower authority, and theater procedures, must be formalized across services (Joint)
- Delegation of authority must be followed by decentralized execution
- Assimilating, developing, and evaluating airpower processes must occur prior to war
- Airpower C2 must effectively integrate joint and coalition partners
- Leaders must prioritize assets, missions, and targets for unity of effort across the theater

Figure 2

Chapter 3

Air Operations Center:
Defining Today's Airpower Command and Control Capabilities

Command and control has been with us forever. The principles are timeless and universal. Every military commander since the dawn of time has struggled with how best to cope with uncertainty. They have all asked the same questions: What's going on on the battlefield? What does it mean? And what should I do about it? Victory usually came to the commanders who could answer those questions first.

— Col Alan D. Campen
History of Command and Control

Tracing the history of the AOC back through American airpower in conflict, not by name, but by purpose and capability, one finds the heart of the AOC—centralized control of theater-wide airpower. Following the Gulf War, the AOC began to take formal shape and the US Air Force diligently focused on its full development. Furthermore, airpower operations since the Gulf War have served to refine AOC structure, capability development, and execution effectiveness.

On 7 June 2000, General John P. Jumper, then Commander of Air Combat Command, approved the "Air Force Concept of Operations for Aerospace Operations Center."[1] On 8 September 2000, then Chief of Staff General Michael E. Ryan officially declared the AOC a weapon system.[2] Leading up to these dates, the official doctrine, instructions, and policy directives for the AOC evolved into formal operating procedures. Today's AOC is the central vehicle for "planning, direction, control, and coordination of airpower operations."[3] The clearest one line description of the AOC comes from Air Force Instruction 13-1 AOC, Vol 3: "The AOC weapon system is the focal point of

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[1] Air Force Concept of Operations For Aerospace Operations Center (AOCCONOPS), 7 June 2000, Office of Primary Responsibility (OPR), Aerospace Command and Control & Intelligence, Surveillance, Reconnaissance Center (AC2ISRC).

[2] Tech. Sgt. Stefan Alford, *United States Air Force News Release*, (Number 000912-01, September 2001), Reporting on the visit of Gen Ryan to Hurlburt Field, Fla.

[3] Air Force Doctrine Document (AFDD) 2, *Organization, and Employment of Aerospace Power*, 17 February 2000, 71. This document uses the term "aerospace" which has been recently changed back to "air and space." For the purpose of this citation, and any other citation where this terminology occurs, either "air and space" or "airpower" may be substituted for the original without further reference to the change.

operational-level C2 for air and space operations."[4] This concise description officially ties airpower C2 to the AOC. Therefore, analyzing the structure of the AOC by using the framework outlined in official airpower C2 doctrine—personnel, technology, and processes—is both appropriate and complementary to this research.[5]

This chapter presents the current AOC capabilities as outlined in doctrine, AOC instructions, Air Force policy, and by information gathered through interviews with experienced AOC senior officers. It compiles a comprehensive list of AOC capabilities for a comparison with the historical concepts derived in chapter two. The comparison shows that today's AOC capabilities have an historical and enduring basis. Furthermore, this chapter shows that historical airpower C2 requirements are satisfied and effectively translate into current AOC concepts for operations. AOC capabilities must drive subsequent AOC leadership development. This chapter is important because it establishes the relevancy of today's AOC capabilities, which form the foundation for analyzing AOC leadership development in the next chapter. Although the cumulative airpower concepts presented at the conclusion of chapter two are not representative of every possible airpower concept, for this research, they provide a sufficient basis for determining the relevance of current AOC capabilities.

Because this study intentionally derived the historical concepts before researching the AOC capabilities (to remain unbiased), the language of the concepts differs from that of the capabilities. However, by using the airpower C2 personnel, technology, and processes framework, the common attributes between the historical concepts and the AOC capabilities are easily recognized. Within this framework, a summary of the AOC required capabilities concludes this chapter.

PERSONNEL

An examination of AOC personnel "covers the human aspect of command and control."[6] Studies of airpower C2 (now specifically the AOC) often focuses only on the

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[4] Air Force Instruction (AFI) 13-1 AOC, Volume 3, *Operational Procedures—Aerospace Operations Center,* 2001 (in draft), 11-3.1.
[5] Air Force Doctrine Document (AFDD) 2-8, *Command and Control*, 2001, 2.
[6] Joint Publication (JP), 3-56.1, *Command and Control of Joint Air Operations*, 14 Nov 1994, 2.

internal technology and processes; however, one historian draws the following conclusion:

> The command and control technology that we have is really critical to how we fight modern war. But in the final analysis, it's a man making a decision and it's a commander, his training, and his experience that makes the difference in war.[7]

Just as Billy Mitchell "carried the day" at St Mihiel in World War I, today airpower personnel are an extremely important part of effective AOC operations. In fact, "the foundation of an AOC is people, a carefully designated mix of cadre and augmentee personnel forged into interactive teams."[8]

Within the AOC, "personnel are responsible for planning, executing, and assessing aerospace operations and directing changes as the situation dictates."[9] This requires "flexibility of thought and creative problem-solving skills…under stress and in unfamiliar environments."[10] Furthermore, AOC leaders are expected to understand both joint and combined operations. The AOC is often designated as a JAOC or COAC for Joint AOC or Combined AOC operations respectively.[11] Designation of the term "Joint" contained in the JFACC title further emphasizes the requirement for AOC leadership to be a joint effort. These designations are important in developing synergy among the services and allied airpower. Additionally, service and joint doctrine have formally defined the authority of the JFACC and his chain of command.[12] Within the AOC, joint billets and coalition representation enable AOC leaders (some of whom are officers other than Air Force) to communicate across service lines, coordinate for effective and efficient airpower operations, and help ensure unity of effort.[13]

The personnel designated as leaders within an AOC require specific abilities based on various functions built directly into the AOC. Figure 3 shows the AOC functions outlined in doctrine and AOC instructions.[14] The purpose of presenting these

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[7] John F. Antal III, *Weapons at War—Command and Control*, VHS Documentary—Cat # AAE-42585, Greystone Communication Inc., New Video Group, 1998.
[8] AFI 13-1, AOC Vol 3, 11-3.1.2.
[9] AFDD 2, 71.
[10] AFDD 2-8, 44.
[11] AFI 13-1 AOC, Vol 3, 7-1.2.6.
[12] JP 3-56.1, 2-12.
[13] AFI 13-1 AOC, Vol 3, 8-2.2. JP 3-56.1, 2-12.
[14] AFDD 2, 71-72.

functions is to illustrate the wide spectrum of airpower capabilities and limitations airpower leaders in the AOC are required, by regulation, to understand.

PRIMARY JAOC FUNCTIONS

- **Develop aerospace operations strategy and planning documents that integrate air, space, and information operations to meet JFACC objectives and guidance.**
- **Task and execute day-to-day aerospace operations; provide rapid reaction, positive control, and coordinate and deconflict weapons employment as well as integrate the total aerospace effort.**
- **Receive, assemble, analyze, filter, and disseminate all-source intelligence and weather information to support aerospace operations planning, execution, and assessment.**
- **Issue airspace control procedures and coordinate airspace control activities for the Airspace Control Authority (ACA) when the JFACC is designated the ACA.**
- **Provide overall direction of air defense, including Theater Missile Defense (TMD), for the Area Air Defense Commander (AADC) when the JFACC is designated the AADC.**
- **Plan, task, and execute the theater ISR mission.**
- **Conduct operational-level assessment to determine mission and overall aerospace operations effectiveness as required by the JFC to support the theater combat assessment effort.**
- **Produce and disseminate an ATO and changes.**
- **Provide for the integration and support of all air mobility missions.**

Figure 3

Furthermore, Figure 4 is a condensed list of official directives describing the specific JFACC responsibilities (the highest authority within the AOC). This list, though specifically for the JFACC, shows the tremendous spectrum of knowledge leaders must have for AOC positions.[15]

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[15] Chairman of the Joint Chiefs of Staff Manual (CJCSM) 3500.xx, *JFACC Master Training Guide, Air Commanders Handbook for the JFACC*, 16 April 2001.

JFACC RESPONSIBILITIES

- **Advising JFC on the proper employment of all forces under control of the JFACC**
- **Developing a joint air operations plan**
- **Recommending appointment of joint air effort to the JFC after consulting with other component commanders**
- **Providing direction for allocation and tasking**
- **Controlling execution of joint air operations as specified by the JFC**
- **Coordinating joint air operations with operations of other component commanders**

- **Evaluating results of joint air operations and forwarding assessments to the JFC**
- **Performing duties of airspace control authority***
- **Performing duties of area air defense commander***
- **Functioning as supported commander**
- **Establishing combat identification SOPs and other directives based on JFC guidance**
- **Issuing planning guidance**
- **Analyzing various courses of action**

* When assigned

Figure 4

Within the AOC, there are approximately thirty-five positions this research designates as "leadership positions." Because the AOC is tailorable and flexible, these positions will vary (increase or decrease) depending on the specific contingency environment. Figure 5 is a compiled list of probable AOC leadership positions including an estimated level of leadership from 1 to 3.[16] A designation of 1 means the position requires a complete understanding of all available AOC capabilities. This does not mean "expert" of all AOC capabilities, rather an "appreciation and awareness." A designation of 2 characterizes a subordinate position yet requires a thorough understanding of nearly all AOC capabilities. This designation also infers a "specialty" for one or more capabilities within the AOC. Finally, a designation of 3 suggests a leader who understands and is responsible for a specific AOC capability. This leader needs to be aware of various other AOC operations, but to a smaller degree.

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[16] AFI 13-1 AOC, Vol 3, 11-99. JP 3-56.1. AFDD 2, 77-83. This list was derived from examining the responsibilities of the positions within the AOC as outlined in the AOC instruction. They are not listed in this format in the instruction, rather, they are spread throughout.

LEADERSHIP POSITIONS IN THE AOC

1 JFACC	2 Chief of Analysis
1 JFACC Staff	2 Chief of Targeting and BDA
1 AOC Director	2 Senior Offensive Duty Officer
1 Strategy Division Chief	2 Deputy Chief of Air Mobility Division
1 Combat Plans Division Chief	2 Deputy Chief of Airlift Control Team
1 Combat Operations Division Chief	2 Deputy Chief of Air Refueling Control Team
1 Chief of ISR	2 Deputy Chief of Air Mobility Control Team
1 Director of Mobility Forces	2 Deputy Chief of Aeromedical Evacuation Team
1 Chief of Air Mobility Division	2 Deputy Chief of Air Mobility Element
1 Chief of AOC systems.	2 Information Warfare Team Chief
2 Strategy Plans Team Chief	2 Judge Advocate
2 Guidance Apportionment and Targeting (GAT) Chief	3 Offensive Duty Officer (multiple positions)
2 Operational Assessment (OA) Team Chief	3 Defensive Duty Officers (multiple positions)
2 Master Air Attack Plan (MAAP) Team Chief	3 Chief of Collection Management
2 Air Tasking Order (ATO) Production Team Chief	3 Support Function Officers (multiple positions)
2 C2 Planning Team Chief	3 Weather Support Team Chief
2 Senior Air Defense Officer	3 Logistics Team Chief

Figure 5

This information highlights the tremendous operational depth leaders designated with a 1 are required to have for effective accomplishment of AOC duties. All of the leaders listed are actively part of planning, executing, and monitoring important aspects of an air campaign, however, those leaders designated with a 1 require knowledge across all functions and positions. The number of AOC related acronyms (nearly 400), and AOC related definitions (nearly 150), are overwhelming, requiring highly educated and trained personnel (see Appendix A).[17] This requirement drives the need for considerable education and training under a deliberate—comprehensive—system.

Regarding the strengths of the AOC as a vehicle for airpower C2 and the attributes required of AOC leaders, Lt Gen Michael C. Short (USAF, Retired), CFACC for Operation Allied Force, offered the following perspective:[18]

> I think the strength is the *quality of the people*…[AOC leaders] have to understand airpower…you need to understand information operations, you've got to understand space, you need to understand kinetic and non-kinetic ops. You've got to have a *very broad perspective of airpower* and

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[17] Appendix A was taken from the "Joint Force Air Component Commander Master Training Guide," January 2001. This is the document used to train AOC leaders (potential JFACCs) for current operations. This requirement for AOC leadership personnel is not an issue of technology or processes; rather, this goes to the heart of showing how AOC leaders require significant development to be able to communicate effectively and operate within the AOC.

[18] Lt Gen Michael C. Short, United States Air Force, interviewed by author, 16 December 2001. Italics and emphasis added.

what it brings about. You've got to have a *joint perspective.* You shouldn't be one of those zealots that just focuses on airpower; you need to understand who the customer is…. It's important for people to understand the AOC processes; understand the crisis action planning; how do I get my guidance from the CINC and how to translate it into JFACC guidance and into air operations directives; what role the strategy bunch plays and how that works its way through the Guidance, Apportionment and Targeting (GAT), Master Air Attack Plan (MAAP), and ATO production. They [AOC leaders] need to understand what's going on in the employment arena and how we do assessment. *I think you need to understand all those tools or you really can't participate in the command and control of airpower.*

Lt Gen Short is an experienced Air Force warfighter who understands what is important for AOC leaders. He makes clear that AOC leadership positions require tremendous knowledge, experience, and a keen sense of what is happening throughout the AOC and across the theater of operations. Figure 6 illustrates the integration of airpower functions (rows) throughout all of the AOC divisions (columns)—highlighting the message General Short presented.

CROSS FUNCTIONAL ORGANIZATION

	Strategy Division	Combat Plans Division	Combat Operations Division	ISR Division	Air Mobility Division
Component Liaisons	Strategy Plans Team	MAAP Team	Offensive Operations Team	Analysis Correlation and Fusion Team	Airlift Control Team
Area Air Defense					
Information Warfare	GAT Team	ATO Production Team	Defensive Operations Team	Targeting/ BDA Team	Air Refueling Control Team
Space					
Logistics/Sustainment	Operational Assessment Team	C2 Planning Team		Collection Management Team	
Airspace Management					Air Mobility Control Team
Weather				PED Team	
Legal					
Rescue Coordination				SCI Management Team	Aeromedical Evacuation Team
System Administration					
Air-to-Air Refueling					Air Mobility Element
Communications				RFI Management Team	
(Others as needed)					

Figure 6

In terms of personnel, each division requires functional expertise to coordinate across each of the other divisions. A large majority of the inter-divisional coordination is the responsibility of the various leaders within each division. This requires that division leaders not only understand their own area responsibilities, but they must also understand how their actions affect the other divisions. Therefore, today's AOC operations require personnel capable of coordinating, integrating, and understanding airpower functions; as well as knowing what tools are available within the system to support their operational responsibilities. As the position of leadership rises to the top of the division, to the AOC director, and to the level of the JFACC, the demands for competent personnel greatly increase.

TECHNOLOGY

Technology is an extremely important facet of today's AOC. The required capabilities of the AOC depend on advanced technology for effective and efficient operations. "Technology covers the equipment, communications, and the facilities needed to overcome the war-fighting problems of integrating actions across space and time."[19] The technological capabilities of the AOC have improved tremendously over the past ten years. The ability of airmen to find, fix, track, target, engage, and assess are highly dependent on the capabilities of technology. An examination of current AOC and airpower technology suggests that today's required capabilities sufficiently incorporate the historical concepts presented previously in chapter two. The capability of the AOC to meet, and even surpass, the historical conceptual requirements of airpower C2 has been tremendously successful—arming airpower leaders with the tools they need to execute an effective air campaign.

Technology enables airpower C2 by organizing data, disseminating information, providing communication capabilities, and managing complex—high speed— operations. "The evolution of C2 has centered around the technology of computers and communication. We can handle lots more data and give direction more quickly and in more detail."[20] "Technology elements tend to dominate command and control doctrine, because high technology characterizes American warfare."[21] However, with the advent of new, better, technology comes the requirement for educated and trained leaders who can fully exploit its capabilities in war. Peter Paret notes:

> …it is not so much the possession of superior technology which determines a conflict, but its intellectual mastery. One caveat therefore applies to all the following assertions about operational impact on air and space power of new weapons and systems: 'provided they are appropriate to the political objective, relevant to the operational circumstances, and *used with skill and understanding.*'[22]

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[19] JP 3-56.1, 2.
[20] General Chuck Horner, United States Air Force, interviewed by author, 21 November 2001. Answer is part of his response to a question concerning how airpower C2 has evolved.
[21] JP 3-56.1, 2.
[22] Quoted in Air Vice-Marshal Tony Mason, *The Aerospace Revolution,* (London: Brassey's, 1998), 15. Emphasis added.

Paret suggests that the best technology is only as good as the intellectual ability of the leader using it. In order to examine the education and training required of AOC leaders, an analysis of the current AOC technologies is important. By showing that current AOC technology sufficiently addresses historical concepts, analysis of subsequent education and training can appropriately follow.

"At the technology's heart lies the speed, accuracy, complexity, and coordination of information acquisition and processing systems"; transitioning this statement into airpower capabilities is the mission of the AOC.[23] Today's AOC manages the operations of numerous aircraft, spacecraft, and ground based sensors—each designed to support a specific airpower function. The AOC is responsible for the C2 of nearly all the airpower functions outlined by Department of Defense Directives, joint and Air Force doctrine.[24] In order to appreciate the number of airpower tasks the AOC must effectively and efficiently manage, Figure 7 outlines the major airpower functions.[25]

AIR AND SPACE POWER FUNCTIONS

COUNTERAIR	SPACELIFT
COUNTERSPACE	SPECIAL OPS EMPLOYMENT
COUNTER LAND	INTELLIGENCE
COUNTERSEA	SURVEILLANCE
COUNTERINFORMATION	RECONNAISSANCE
STRATEGIC ATTACK	COMBAT SEARCH AND RESCUE
COMMAND AND CONTROL	NAVIGATION AND POSITIONING
AIRLIFT	WEATHER SERVICES
AIR REFUELING	

Figure 7

A comparison of the airpower functions in Figure 7 with the AOC functions in Figure 3 shows that the AOC has the responsibility to orchestrate (to various degrees) all of the required airpower functions effectively. Furthermore, a comparison of Figure 7 airpower functions with the AOC leadership positions in Figure 5 shows that the AOC has specific manning dedicated to each function. From using airlift for global reach, space for precision operations (imagery, communications, positioning), and the right

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[23] Mason, 79.
[24] See Department of Defense Directive (DODD) 5100.1. The Air Force is the only US Service specifically directed to "organize, train , and equip, and provide forces for the conduct of prompt and sustained combat operations in the air…." Also see JP 3-56.1, for Joint descriptions, and AFDD 1 for Air Force descriptions.
[25] AFDD 1 , 45.

weapon for combat force, AOC technology is required to manage the full spectrum of air and space power across all services.

The success of AOC technology comes out in the words shared by Major General John Barry, Director of Strategic Plans on the Air Staff, in an interview regarding AOC leaders. When questioned about the efficacy of AOC operations, he pointed out the following accomplishments of Gulf War airpower operations:

> …what did we do it with? We did it with the Army, Navy, Air Force, Marine Corp and coalition parties. We did it with bombers, fighters, tankers, helicopters, ABCCC [Airborne Battlefield Command and Control Center], AWACS [Airborne Warning and Control System], and JSTARS [Joint Surveillance Target Attack Radar System]; with drones and with satellites and communications nodes and folks on the ground, in some cases Special Forces; all those things are intricate. You tell me when that has ever been done in history. Has anyone ever combined a system of systems integration like that? That is the true strength I think of the United States. …So those kinds of integrated elements are absolutely essential for our future—that integration—that ability to work the system of systems in the AOC.[26]

The successful application of airpower General Barry describes occurred over eleven years ago, with less than optimum technologies. However, the C2 technology that was able to help orchestrate the Gulf War, has not only formally found its way into the AOC, but has also dramatically improved. Referring to the list of AOC technology and required system equipment in Appendix B, one sees the enormous amount of required technology capabilities for today's AOC. The technology required to meet the needs of modern airpower warfighters is extremely complex, yet it must be "user friendly" and adaptable. The systems must integrate joint services and certain allied forces as well. Classification of some information requires "US ONLY" dissemination—a challenge that may well be fixed by technology in the future.

The application of airpower C2 technology has been shown to be extremely effective—enhancing the ability for airpower C2 leaders to wage an effective air campaign. Early, preliminary findings from Operation Enduring Freedom suggest that the capabilities afforded by technology in the CAOC were tremendously successful.

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[26] Major General John Barry, Director of Strategic Plans Air Staff, interviewed by the author, 17 December 2001.

For years, bombing campaigns had to be mapped out for days in advance. Planners would design grand blueprints and leave the tactical details to the ops people. But now, thanks to spy-in-the-sky satellites, planes with sophisticated downward-looking radar—and, especially, unmanned drones that can loiter over the battlefield—the Air Force can be much more flexible and nimble. Warplanes can be retargeted on short notice and even in "real time." In Afghanistan, Predator drones worked brilliantly with Special Forces on the ground, spotting targets and "painting" them with laser beams for bombers flying high overhead. Precision smart bombs, much ballyhooed in the gulf war but in fact used less than 5 percent of the time, have now become standard ordnance…. Still, coordinating these strikes is an extremely tricky logistical and political exercise…. With modern technology, hot-rod pilots who fly low and fast will still be important--but not as important as those who choreograph the intricate dance in the skies.[27]

The successes and gains in airpower C2 technology over the past ten-plus years can be expected to continue into the future. Initiatives specifically outlining future AOC technology requirements are currently making official publication. A recent Air Force study on air and space integration, signed by the Air Force Chief of Staff and the Secretary of the Air Force, directly mandates required capabilities for the AOC:

We will improve warfighting support through the use of high technology systems and networks that task, process, exploit, and distribute information. In conjunction with the establishment of the AOC as a weapon system, the Air Force will design, develop, and test additional systems and procedures for better execution of data fusion. …our data fusion system will fuse all C2 and ISR data for *all mission areas* in the AOC.[28]

The construct of technology within the AOC addresses the needs of airpower functions; and the official vision of the Air Force, as stated above, suggests the same requirements (or more) remain for the future. There is little disagreement that current airpower C2 requirements, as constructed in the AOC, have very specific and vitally important technology needs. The development of leaders who can effectively exploit technology to their advantage, and maintain currency on new emerging technology, requires a dedicated and deliberate developmental system. For now, this chapter's examination suggests

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[27] John Barry, "Lt. Gen. Charles F. Wald," *Newsweek*, 31 December 2001.
[28] *Aerospace Integration Plan, Toward A Full Spectrum Force*, Volume One, 5 January 2001, emphasis added.

current airpower C2 technology sufficiently incorporates the historical and enduring concepts.

PROCESSES

Airpower C2 covers a wide range of activities and functions, however, C2 processes, in general, "encompasses procedures."[29] Within the AOC, there are numerous procedures that utilize the expertise of the personnel and the superior capabilities of technology. The deliberately designed AOC processes are flexible—tailoring operations to meet the needs of the war-fighter. The AOC is the JFACC's weapon system that enables him to process the air war with effective and efficient execution. The "execution" capability of the AOC is the one true measure that determines its utility in war. The processes that enable the AOC to C2 effectively the full spectrum of airpower execution are established in doctrine, official policy, and instructions.

In June 2000, the Aerospace Command and Control & Intelligence, Surveillance, Reconnaissance Center (AC2ISRC) prepared the first "Air Force Concept Of Operations For Aerospace Operations Center (AOCCONOPS)." Gen. Jumper, then ACC Commander, approved the document and disseminated it for field level review and feedback. The AOCCONOPS present senior level guidance for the required processes and subsequent execution capabilities of the AOC. A summary of the AOC processes and execution guidance is illustrated in Figure 8. Each of the quadrants represents a process in the AOC: Battlespace Awareness, Horizontal/Vertical Integration, Dynamic Decision Making, and Continuous Assessment.[30] The list of AOC leaders presented previously in Figure 5, disperse throughout this matrix of AOC processes.

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[29] JP 3-56.1, 2.
[30] Abbreviations in graphic: Common Operational Picture (COP), Weather (WX), Joint Task Force (JTF), Joint Operations Center (JOC), Wing Operations Center (WOC), Expeditionary Operations center (EOC), Ground or Airborne Elements of the Tactical Air Control System (G/AETACS), Joint Integrated Prioritized Target List (JIPTL).

DYNAMIC EXECUTION PROCESSES
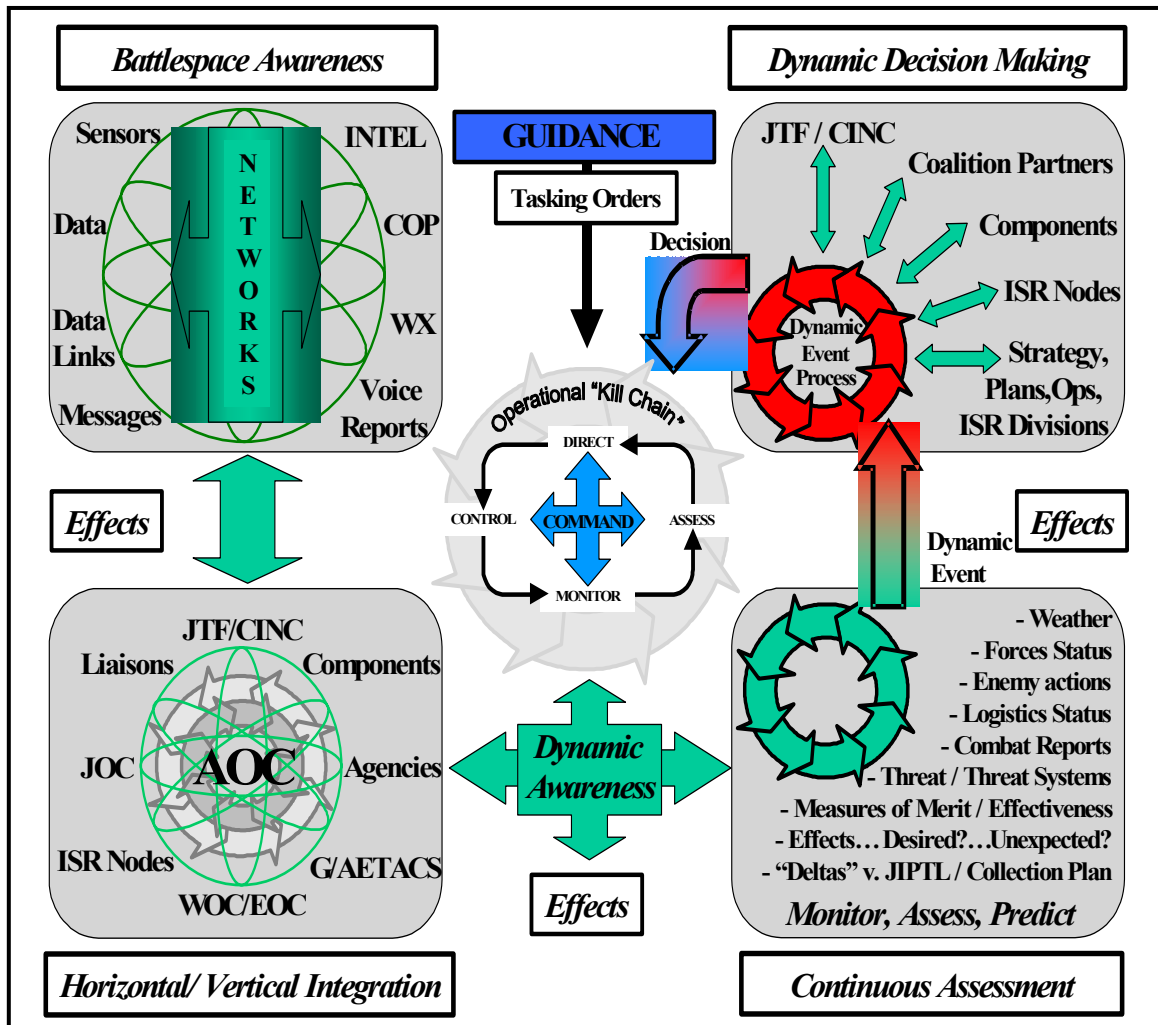
Figure 8

Source: *Air Force Concept of Operations For Aerospace Operations Center*, 7 June 2000, 18.

The effectiveness of each of the four major processes are dependant on AOC leaders understanding of the system. General Chuck Horner commented on the Battlespace Awareness afforded by the AOC:

> The AOC provides the JFACC a theater-wide view of the operation. Unlike the Army that emphasizes the Corps TOC [Tactical Operations Center] and therefore has a limited view of the battle, the AOC allows the air commander insights to the planning and execution of operations throughout the entire friendly and enemy areas of operations. As a result, the air commander and the Joint Force Commander operate at the same

level of awareness and concern. ...The AOC affords insights into current operations as they are occurring.[31]

General Horner describes one of the most important processes that the AOC accomplishes—situational awareness of the battlespace. This theater-wide awareness allows the JFACC to plan, execute, and assess joint and coalition air operations effectively in near real-time. The network processes enabling battlespace awareness as illustrated in Figure 6, are summarized in the AOCCONOPS:

> Battlespace Awareness, in a Common Operational Picture for example, combines information from air, surface, subsurface, ground, and space assets to provide a three-dimensional view of the battlespace. Sensor and data fusion within this picture plays an important role in validating targets and eliminating ambiguous information. The information provided under the umbrella of Battlespace Awareness is shared throughout the AOC.[32]

"C2 processes are the structured basis of informed decision making."[33] The processes in the AOC are designed to help airpower C2 leaders make the best decisions possible. Each process enables information, direction, and feedback to flow from the top down and from the bottom up. The Dynamic Decision Making quadrant in Figure 8 reflects the processes that enable airpower leaders to "Find, Fix, Track, Target, Engage, and Assess during the course of dynamic execution."[34] Furthermore, decision making in the AOC is the result of both planned and unplanned operations. The decisions AOC leaders often must make are not based on a complete intelligence picture; the tempo of the war, however, requires timely decisions. Therefore, the processes of the AOC support dynamic decision making that is either planned or unplanned.[35] For leaders with the responsibility of making decisions in the AOC, General Short sums it up: "I think flexibility, *the ability to make decisions*, to accept responsibility, and knowledge of airpower is really, really important."[36]

Within airpower operations, leaders must be able to monitor constantly the movements of the enemy, assess the effectiveness of forces, and predict possible future

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[31] Horner interview. Answer is part of his response to a question concerning how airpower C2 has evolved.
[32] AOCONOPS, 8.
[33] JP 3-56.1, 8.
[34] AOCCONOPS, 11.
[35] Aerospace Commanders Handbook (ACH) for the JFACC, 27 June 2001, 83.
[36] Short interview.

battlefield necessities. This level of Continuous Assessment requires that AOC leaders have "current information to produce feedback. Feedback is essential to correct errant results or to issue new orders that exploit advantages."[37] AOC processes deliberately "push and pull" information both in and out of the AOC. AOCCONOPS clarifies and expands the processes of airpower C2 assessment within the AOC:

> Collaboration among AOC functions and between the AOC and external agencies is essential for proactive execution, and enables combat operations to best assess and deal with dynamic situations. During execution, this collaboration also serves to validate the plan…. As unexpected/unplanned events occur which affect the plan (e.g. strike package delays), combat operations will assess impact on their own functional area, the impact on the current operation, level of reporting required, and then develop options for the decision maker. [38]

The ability of AOC leaders to act and react is dependant on receiving continuous and timely feedback, accurate pre and post strike measurements, enemy location and maneuver details, and clear threat analysis; the Continuous Assessment processes built into the AOC provides these capabilities to leaders.

Operations within the AOC do not occur in isolation, rather, they occur in tandem with various other operations both in and out of theater. Airpower C2 leaders must have a system that supports effective and timely communication outside the AOC walls. Guidance from the JFC, liaisons from both government and non-government agencies, and a variety of service and coalition coordination is required; within the AOC, Horizontal/Vertical Integration provides this capability. Figure 9 illustrates the coordination elements within the AOC that vertically connects national level guidance through the C2 system with the shooter. Horizontal integration ties together the plan, execution, and assessment processes originating in the AOC. Within this sphere of integration, is a "seamless linkage" of elements "to optimize personnel, functional, and support system capabilities."[39]

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[37] JP 3-56.1, 9.
[38] AOCCONOPS, 10.
[39] AOCCONOPS, 3.

HORIZONTAL/VERTICAL INTEGRATION
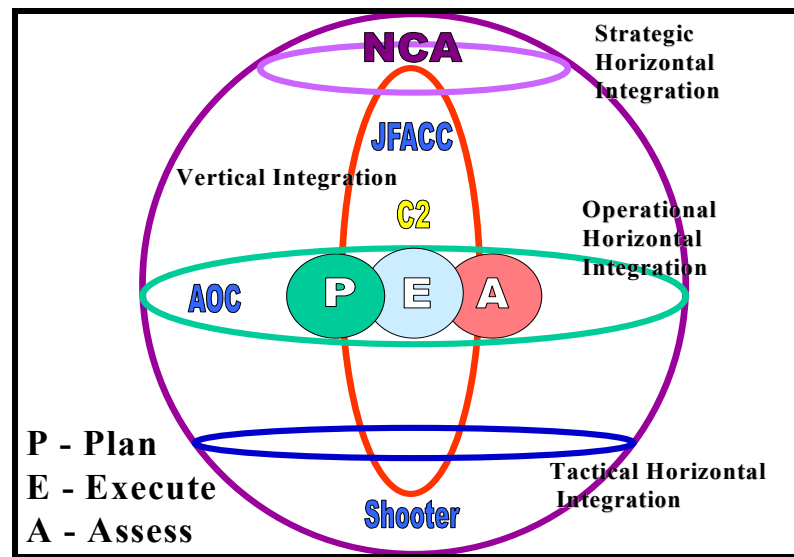
Figure 9

Source: *Air Force Concept of Operations For Aerospace Operations Center*, 7 June 2000, 3.

The dynamic execution processes are the fundamental characteristics built into the AOC for effective airpower C2. Moreover, each of the four major process areas enable five core divisions within the AOC to efficiently operate: Strategy Division, Plans Division, Operations Division, ISR Division, and Air Mobility Division. Each division plays an integral part in the execution processes required within an air campaign. Each division contains key leadership positions (reference Figure 5) requiring the diligent application of airpower knowledge. The specific details and procedures of each division have evolved over the past 10 years—some expanding, while others streamlining. Today, the five core divisions manage forty-eight processes that support operations both in and out of the theater.[40] Figure 10 presents the current forty-eight processes of the five divisions; however, the dynamics of the AOC continue to foster improvements and often-rapid changes, which in turn cause these processes to change. The processes of the five core divisions are overwhelming when considering the expertise airpower leaders must obtain in order to effectively operate within the AOC.

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[40] Gen Croker, "Briefing Slides JFACC Course," *JFACC Handbook* CD-ROM, Air Force Doctrine Center, 16 April 2001.

FORTY-EIGHT PROCESSES CENTRAL TO THE AOC

Strategy Division
1. Develops CFACC Aerospace estimate of situation
2. Develops and coordinates the Joint Aerospace Operations Plan (JAOP)
3. Develops Joint Aerospace Strategy
4. Assesses JAOP support to the joint campaign
5. Translates National Command Authority (NCA), and JFACC guidance into objectives, tasks, and measures of merit
6. Generates recommended apportionment decision for CJTF
7. Determines priority, sequencing and phasing for the execution of the developed tasks
8. Serves as the primary liaison with Commander Joint Task Force (CJTF) planners
9. Integrates functional/service component task requirements into the ATO
10. Monitors and assesses the progress of air phases, provides overall operational level combat assessment with respect to the aerospace objectives
11. Develops alternative contingency plans and courses of actions (COAs)
12. Provides input to the development of an ISR plan for the CJTF
13. Provides input to the development of an information operations (IO) plan for the CJTF

Plans Division
14. Develops combat assessment to achieve CJTF and CFACC objectives
15. Determines the optimal combination of target, platform, weapon, and timing for missions included in the ATO
16. Ensures aerospace tasking supports the overall CJTF campaign
17. Produces and disseminates the Area Air Defense Plan (ADP)
18. Produces and disseminates the Airspace Control Plan (ACP)
19. Produces and disseminates an operationally and tactically sound ATO
20. Generates special instructions (SPINS) and the daily air space control order (ACO) or ACO updates

Operations Division
21. Executes the current ATO through constant monitoring of air missions under control of the theater air control system
22. Evaluates IO effectiveness, to include ISR feedback
23. Adjusts the ATO as necessary in response to battlespace dynamics (e.g. assigned targets are no longer valid, high priority targets are detected, enemy action threatens friendly forces)
24. Coordinates emergency and immediate air support requests
25. Monitors and recommends changes to defensive operations
26. Publishes changes to the ATO
27. Provides feedback on status of the current ATO

ISR Division
28. Integrates ISR across AOC (Strategy, Plans, Operations, Air Mobility)
29. Develops and maintains Intelligence Preparation of the Battlespace (IPB)
30. Insures ISR support to AOC activities (Strategy, Plans Operations, Air Mobility) and subordinate units
31. Incorporates ISR liaisons (Battlefield Coordination Detachment, Space, etc.)
32. Accomplishes Analysis, Correlation, and Fusion (ACF)
33. Provides Predictive Battlespace Awareness and Real-time Threat Advisory
34. Develops and predicts enemy Courses of Action
35. Maintains Target Data Bases
36. Performs Target Development, Nomination, and Weaponeering
37. Find, fix, locate, track, target and assess Time Critical Targets (TCTs)
38. Conducts and applies Strike & CFACC Operational Assessments
39. Develops an ISR support plan
40. Produces an ATO Reconnaissance, Surveillance, and Target Acquisition (RSTA) annex
41. Conducts ISR tasking, Processing, Exploitation and Dissemination (TPED) Battle Management (BM)

Air Mobility Division
42. Integrates and directs the execution of intra-theater and inter-theater air mobility forces operation in the area of responsibility/ joint operating area (AOR/JOA) and in support of the CJTF's requirements and objectives
43. Maintains the flow of intra-theater and inter-theater air mobility assets in support of the
44. Coordinates air mobility support for mobility requirements identified and validated by the CCJTF requirements and movement authority as appropriate
45. Coordinates aerial refueling planning, tasking, and scheduling, to support inter-theater and intra-theater air operations
46. Participates in the aerospace assessment, planning, and execution process and coordinates with the CAOC director to ensure the air mobility mission is incorporated in the ATO
47. Identifies ISR requirements in support of the air mobility mission
48. Ensures intra-theater air mobility missions are visible in the AMC standard C2 system and reflected in the ATO/ACO

Figure 10

In summary, effective airpower operations require specific capabilities—capabilities that are now formally contained in the AOC processes. However, the procedures of the AOC do not neglect the fact that humans make the decisions, while technology and systems support the decision process. Therefore, central to AOC dynamic execution processes, as depicted in Figure 8, is command. Within this process, theater-wide airpower is placed under the command of a single airman—the JFACC. The JFACC directs, controls, monitors, and assesses in a continuing cycle throughout the duration of hostilities. The AOC, as his weapon system, provides the capabilities to wage an effective air campaign.

The processes presented here are the major, foundational processes directly built into the current AOC. The operations these processes initiate and monitor number in the hundreds—from the details of mobility, logistics, and space, to information warfare, target selection, and battle damage assessment.[41] Every American and coalition aircraft requires unique processes to prepare, package, and sustain. With the advent of unmanned combat aerial vehicles; space assets for weather, imagery, communication, and navigation; stealth technology and reachback operations; the processes in the AOC are more important than ever before. Examination of the current AOC processes reveals a list of capabilities unmatched by any airpower in the world.

CONCLUSION

This chapter's examination of AOC capabilities supports this research in two ways. First, it shows that the current AOC formal and documented requirements sufficiently incorporate the historical concepts presented in the previous chapter. This is very important and answers most questions regarding the relevancy of AOC required capabilities. It is also important to note, that the AOC capabilities presented have not necessarily been "proven capabilities" in war—that determination is not within the scope of this work. The AOC capabilities presented here are only those that the instructions,

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[41] Air Force Instruction (AFI) 13-1 AOC, Volume 3, *Operational Procedures—Aerospace Operations Center,* 1 June 1999, Attachment 5, 109-122. This document presents every process currently conducted in the AOC (as of 1999). The list is overwhelming and without question, shows the immense requirements placed on AOC personnel, and ultimately, AOC leadership. Although AOC leaders are not required to understand all the processes, they must be keenly aware of what is available, and how it supports airpower C2 capabilities.

directives, doctrine, and senior officers have declared as "required capabilities for today's AOC." These capabilities are what the AOC "should" be able to do. By defining the required capabilities of the AOC, the subsequent analysis, suggestions, and considerations for improved AOC leadership development, are based on confirmed and relevant "needs."

Second, this chapter highlights the tremendous amount of knowledge and skill required of airpower leaders. It would be difficult to define "airpower expert" to a level agreeable to all airmen; however, based on the information in this chapter, it seems a strong argument that today's AOC leaders must be extremely adept and highly experienced. This chapter suggests that if officers are going to be able to lead in today's AOC effectively, they will require a systematic and deliberate development continuum.

Figure 11 is a comprehensive list of the AOC capabilities presented in this chapter. A comparison with the historical concepts derived in chapter two suggests that today's required AOC capabilities sufficiently incorporate (to varying degrees) the enduring historical concepts. (See Appendix C for a visual comparison of the historical concepts and current AOC capabilities). The required capabilities within the construct of the AOC mirror the historical personnel C2 concepts extremely close, while the required capabilities for technology surpass the historical concepts. The current required capabilities for airpower C2 processes sufficiently incorporate and even expand beyond the historical concepts. This chapter concludes that the enduring lessons and themes that helped to develop the historical concepts of airpower C2 have not been avoided, misplaced, or forgotten; rather, they have sufficiently transposed into today's AOC concept of operations.

Figure 11 below is an assimilation of today's required AOC capabilities. developed and presented in this chapter. The capabilities presented are not all-inclusive and fall short of representing all possible AOC capabilities; however, for the purpose of this research, and comparison with the historical concepts, they adequately represent current guidance and directives.

REQUIRED CAPABILITIES OF TODAY'S AOC

REQUIRED CAPABILITIES OF CURRENT AOC PERSONNEL
- AOC leaders must be experts in airpower planning, direction, and execution
- AOC leaders must understand both joint and combined operations
- AOC leaders must flexibly direct changes as the situation dictates
- AOC leaders require creative problem-solving skills for unfamiliar enemy environments
- AOC personnel must be forged into interactive teams
- AOC personnel must understand defined authority of the JFACC and his chain of command
- Airpower leaders must have extensive experience, education, and training

REQUIRED CAPABILITIES OF CURRENT AOC TECHNOLOGY
- AOC technology must be able to manage numerous air and space platforms throughout the theater
- AOC technology must continue to improve, looking ahead to future needs
- Technology must be fully integrated among all services and support a variety of joint operations
- Technology development must remain flexible and prepare for an uncertain future
- All airpower functions must be supportable within the AOC
- Technology must allow for theater-wide communication and dissemination of airpower orders
- Integration of new technologies are required to insure continued US and allied superiority

REQUIRED CAPABILITIES OF CURRENT AOC PROCESSES
- AOC processes must support the JFACC and his operational airpower objectives
- Specific strategic, operational, and tactical level planning must be effectively accomplished
- The AOC must orchestrate all airborne elements to gain unity of effort across the battle space
- The AOC must integrate joint and coalition airpower—personnel, technology, and processes
- The AOC must effectively control all aspects of theater airpower, and be supportive in execution
- New technologies such as space, unmanned vehicles, and stealth, must be sufficiently integrated
- AOC processes must develop a seamless link to Find, Fix, Track, Target, Engage, and Assess

Figure 11

Chapter 4

Airpower Leaders:
An Examination of Current AOC Leadership Development

War is not an affair of chance. A great deal of knowledge, study, and meditation is necessary to conduct it well, and when blows are planned whoever contrives them with the greatest appreciation of their consequences will have a great advantage.

— Fredrick the Great
Instruction for His Generals

An examination of historical airpower C2 revealed a number of concepts that have developed, evolved, and endured over the past century. Framing the concepts into airpower C2 personnel, technology, and processes helped in comparing them with today's airpower C2 capabilities, and showed that the AOC sufficiently incorporates major historical concepts. Starting from the basis that today's AOC requirements for personnel, technology, and processes are relevant and formed with reference to historical precedent, an examination of how the Air Force can best prepare officers for AOC leadership positions is justified and appropriate.

Preparing officers for leadership positions in the AOC requires a comprehensive and deliberate development system. This system must select, develop, and track AOC personnel; teach current and emerging AOC technology applications; and prepare leaders to exploit effectively AOC processes. An examination of the Air Force's current system reveals a wide range of opportunities for AOC leadership development. Assessment of available opportunities reveals several areas requiring improvement in order to ensure effective development of future AOC leaders.

This chapter presents, in three sections, an analysis of current AOC leadership opportunities. Section 1, Current Opportunities, documents and outlines the opportunities that currently exist for developing AOC leaders. This section defines and presents current education, training, and exercises available for AOC leadership

development. Section 2, Assessment, identifies the successful and possible areas of concern associated with the current AOC development system. In conclusion, section three, Recommendations, offers possible solutions to each of the concerns presented in sections two. Moreover, the recommendations focus on how the Air Force can best prepare officers for AOC leadership positions.

Although a large part of this examination includes assimilating available AOC curriculum, this examination focuses on the overall AOC leadership development system and avoids assessing specific content of individual courses. Furthermore, much of the information contained in this analysis is primary source material derived from interviews with experienced airpower C2 leaders.[1] Their insights and expertise help to frame a number of the leadership development problems presented in this chapter.

CURRENT OPPORTUNITIES

This section assimilates and outlines the available courses for developing AOC leaders. There are three major ways to develop AOC leaders: education, training, and exercises. Notably missing from these categories is the area of experience. There is no argument against the idea that experience is a vital factor in the development of airpower leaders; however, experience is difficult to program into a development process and usually occurs simultaneously alongside the other development areas. Although for this examination experience falls outside of the categories presented, there is absolute agreement that effective development of airpower C2 leaders demands the maturity and insight obtained only through military experience.

There is constant disagreement regarding the characteristics of education, training, and exercises; however, the distinction between them is extremely important in examining the current opportunities available for developing AOC leaders. Specifically defining and outlining their unique characteristics helps to clarify further examination and frame the argument for suggested recommendations in the next chapter.[2]

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[1] All interviews were taped on audio cassette and transposed into text. Minor modification of text eliminated unnecessary jargon or parts of speech.

[2] Wargames makeup another unique category in the development of AOC leaders. Wargames, like exercises, offer the opportunity to combine education and training into one event. By definition, a wargame is "a simulation, by whatever means, of a military operation involving two or more opposing

Education develops the knowledge base and thinking ability of AOC leaders. Air Force doctrine defines education as "the process of imparting a body of knowledge to intellectually prepare individuals to deal with dynamic environments and solve ill-defined problems by using critical thought and reasoned skills."[3] Joint doctrine defines military education as "the systematic instruction of individuals in subjects that will enhance their knowledge of the science and art of war."[4] Moreover, the simplest endorsement for education comes from Jimmy Doolittle, "If we have to fight, we should be prepared to do so from the neck up instead of from the neck down."[5]

For officers, education begins the moment of pre-commissioning and continues throughout their career. Current Air Force Professional Military Education (PME) for officers presents a tremendous opportunity to develop the knowledge required to meet the complex challenges of 21st century air and space power. All education that officers formally receive through PME has the same basic, universal objective—develop personnel to meet the demands required of today's Air Force. In most cases, the PME available to officers has tremendous, though indirect, influence on developing the needed characteristics of AOC leaders. Although PME helps develop Air Force leaders, specific AOC objectives within the majority of the PME schools are not easily identified. An examination of PME offered at Air University (AU) reveals that some schools offer, by percentage of their overall curriculum, tremendous AOC specific education, while others offer very little.

There are four PME schools at AU: Air and Space Basic Course (ASBC), Squadron Officer School (SOS), Air Command and Staff College (ACSC), and Air War

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forces, using rules, data, and procedures designed to depict an actual or assumed real life situation." (JP 1-02, 457). The important characteristic of wargaming is allowing participants the opportunity to investigate and evaluate future concepts "that would otherwise be impractical or impossible to validate or disprove." Other than a few specific stand-alone wargames offered through the Air Force Wargaming Institute at AU, most wargames are integrated into the education, training, or exercises associated with AOC leadership development. However, not including wargames as a separate category within this study does not diminish the important part they play in the development process. This author's experience with multiple wargames concludes that airpower C2 leadership development requires dynamic wargaming opportunities.

[3] Air Force Doctrine Document (AFDD) 2-4.3, *Education and Training*, 9 September 1998, 5.

[4] Joint Publication (JP) 1-02, *Department of defense Dictionary of Military and Associated Terms,* 12 April 2001, 266.

[5] AFDD 2-4.3, 1.

College (AWC). Of these four major PME schools, the school designed for Second Lieutenants, ASBC, offers the most comprehensive AOC education.[6] Except for SOS,

AIR UNIVERSITY PROFESSIONAL MILITARY EDUCATION

Course/School/College	Approximate Length
Air and Space Basic Course	4 Weeks
Squadron Officer School	5 Weeks
Air Command and Staff College	10 Months
Air War College	10 Months

Figure 12

which is five weeks, ACSC and AWC are nearly a year long, while ASBC is only 4 weeks (Reference Figure 12). This does not necessarily suggest that ASBC is the only school adequately teaching AOC education; rather, ASBC is the only school teaching AOC *specific* education. Clearly, numerous AOC concepts and characteristics that leaders must learn are diligently offered at all of the schools.[7] In fact, the AOC requirements for leaders to understand joint operations, coalition organization, unity of effort, and unity of command are all central to most PME curriculum. Additionally, this examination revealed that all AU PME curriculum cover air and space functions, principles and tenets of war, military history, and various leadership/communication course work. However, this analysis of the PME schools at AU does suggest that the majority of PME curriculum, except for ASBC, is not deliberately engineered to present even the basic AOC required education.

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[6] ASBC devotes nearly 23% of its curriculum to AOC development. Reference ASBC online web page at http://www.maxwell.af.mil/au/soc/abc/curriculum.htm for review of curriculum and hours. Curriculum of all the major courses offered at AU can be found in the *Air University Catalog*, (Maxwell Air Force Base, Alabama, Air University Press, March 2001). This author has been actively involved with the development, instruction, or attendance of ASBC, SOS, and ACSC. SOS offers no specific AOC education and ACSC offers AOC education on paper, but fails to deliver sufficiently in the classroom. In regards to ACSC, this is based on the author's personnel experience attending ACSC Class 2001. An informal survey of several ACSC graduates agreed with this conclusion. Within the ACSC classroom, none of this author's instructors had any experience working in an AOC, nor had any of them attended any formal AOC training. Their understanding of AOC processes was often inaccurate and lead to confusion among the students. An examination of AWC curriculum suggests that attention is given primarily to the operations at or above the level of JFACC. Little to no significant time is spent learning the organization and complexities of the AOC below the level of the JFACC. It can be argued that AU schools are not wanting nor mandated to teach AOC education and are therefore not to be held responsible for the "course they do not teach." However, this examination will suggest in section 3 that the Air force must integrate AOC education into every PME school if the Air Force is serious about developing AOC leaders
[7] See *Air University Catalog*, (Maxwell Air Force Base, Alabama, Air University Press, March 2001).

Not mentioned as a major PME school is the School of Advanced Airpower Studies (SAAS). Although SAAS is not considered a major PME institution (approximately 27 officers a year attend), the curriculum, and subsequent graduates, have received considerable accolades from experienced C2 leaders. "The mission of [SAAS] is to educate strategists in the art and science of aerospace warfare, thus enhancing the Air Force's capacity to defend the United States through the control and exploitation of air and space."[8] The education received at SAAS directly supports the requirements for several of the leadership positions with today's AOC. Although current SAAS curriculum does not introduce AOC specific coursework,[9] it directly prepares officers for strategic level decision-making and theater-wide operational planning.

COLLEGE OF AEROSPACE DOCTRINE, RESEARCH AND EDUCATION

Course	Length
Aerospace Power Course	Self Paced
Information Warfare Application Course	1 week
Contingency Wartime Planning course	2 weeks
Joint Doctrine Air Campaign Course	2 weeks
Flag Officer Courses:	
+ Joint Flag Officer Warfighting Course	2 weeks
+ Senior Information Warfare Applications Course	1 week
+ Combined Force Air Component Commander Course	1 week
+ Joint Force Air Component Commander Course	1 week

Figure 13

The formal PME schools are not the only education available at AU. The College of Aerospace Doctrine, Research and Education (CADRE) offers a number of courses that directly support the development of AOC leaders. Figure 13 is a list of the courses currently offered at CADRE. From an education perspective, these courses challenge participants and offer a tremendous amount to leaders going into future AOC positions.[10]

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[8] See the School of Advanced Airpower Studies web site, http://www.au.af.mil/au/saas/hist_org.htm.
[9] Class XI, 2002, attended five-weeks of AOC training at Hurlburt Field Florida. This AOC training was the first time in the eleven year history of SAAS that specific AOC training was introduced into the school. The after-action report as to the efficacy of the AOC training has not been developed as of the date of this study. Future AOC training during SAAS will greatly depend on the direction, motivation, and encouragement received from class XI participation and feedback.
[10] The author has completed the Aerospace Power Course, attended the Information Warfare Application Course, and the Joint Doctrine Air Campaign Course. Additionally, the author has taught the Joint

Although education is offered at various locations throughout the Air Force, AU is the central and dominate location. The PME and CADRE courses complement the development of AOC leaders and help provide the Air Force with officers who understand airpower. Although there are continuum initiatives (orchestrating together the curriculum of each PME school) presently being pursued at AU, individual PME school curriculum is developed with little attention to the curriculum offered in other PME schools.

TRAINING

Training, like education, is extremely important in the developmental process of AOC leaders. Uniquely different from education, training focuses on the development of skills. "Training provides the skills necessary for air and space forces to perform their functions and contribute to the accomplishment of United States national security objectives."[11] Training is the process of developing the skills needed to effectively apply required knowledge. Training is often very specific and intended to prepare personnel to accomplish deliberate tasks.

The differences between education and training are often case specific and require an understanding of the specific course objectives. "Education prepares members for planning and leadership roles and makes them more responsive to the dynamic environment in which they will operate, while realistic training provides improved professional skills for all ranks at all levels of command."[12] Simply, education is the transfer of required knowledge while training is preparation to apply knowledge. As with most military operations, the AOC requires personnel with a rich combination of both education and training. The complexities of today's AOC capabilities are extremely demanding. "Only through comprehensive education and rigorous training can individual capabilities be expanded to match these demands."[13]

Doctrine Air Campaign Coursework to senior civilians and 06 officer participants. In nearly every case, the participants had never been exposed to the basic level planning, AOC organization, or airpower C2 curriculum.
[11] AFDD 2-4.3, 17.
[12] Ibid., 1.
[13] Ibid., 1.

AOC training is included in a small percentage of courses offered at AU; however, the majority of AOC training is offered through the Air Force Command and Control Training and Innovation Group (AFC2TIG) at Hurlburt Field, Florida. Moreover, within the course work conducted at AFC2TIG, specific AOC education complements AOC training; however, for the purposes of this examination, the available AOC courses offered by AFC2TIG fall under the category of training.

The training offered at Hurlburt directly and specifically prepares officers for AOC leadership positions. The training has no (limited) connection to the curriculum at AU and is developed and presented in large part by civilian contractors. Figure 14 is a list of the courses offered at Hurlburt Field, followed by a brief overview of each course.[14]

COMMAND AND CONTROL WARRIOR SCHOOL

Course
Joint Aerospace Command and Control Course (JAC2C)
Joint Aerospace Computer Applications Course (JACAC)
Joint Aerospace Systems Administrator Course (JASAC)
Joint Aerospace Operations Senior Staff Course (JSSC)
Joint Combat Rescue Coordination Course (JCSARCC)
Command and Control Warrior Advanced Course (C2WAC)

Figure 14

Joint Aerospace Command and Control Course
Objective: Prepares selected military and DOD civilians to plan, produce, and execute an Air Tasking Order (ATO) in support of a Joint Task Force.
Joint Aerospace Computer Applications Course
Objective: Provides the fundamentals of Theater Battle Management Core Systems operations.
Joint Aerospace Systems Administrator Course (JASAC)
Objective: Provide training to select individuals in the fundamentals of UNIX, Windows NT, Terminal Control Protocol /Internet Protocol networking and communication protocols, relational databases and Theater Battle Management Core Systems system administration.

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[14] This information taken from the AFC2TIG web page located at http://www2.acc.af.mil/afc2tig/text-only/index-txt.html. Minor modifications were made to format material to match this work.

Joint Aerospace Operations Senior Staff Course (JSSC)
Objective: To understand the Joint Forces Air Component Commander organization, strategy development, and typical equipment involved with the operations of a Joint Air Operations Center.

Joint Combat Rescue Coordination Course (JCSARCC)
Objective: To introduce concepts, doctrine, and procedures for combat search and rescue mission management based upon JCS 3-50.XX-series publications.

Command and Control Warrior Advanced Course (C2WAC)
Objective: 1. Comprehend and apply command and control concepts, processes, and decision support systems for planning and employing integrated aerospace power at the operational level of war.
2. Comprehend the principal Joint Force Air Component Commander decisions and relevant considerations in the planning and execution of joint aerospace operations and be able to apply appropriate techniques to provide timely options and recommendations to support his decision-making.
3. Comprehend, develop, and analyze joint air strategies and operational concepts, and evaluate those against enemy strategy with emphasis on assessing the degree to which aerospace forces can produce strategic and operational effects which contribute to the JFC's campaign.
4. Comprehend integration and execution of all capabilities and forces at the operational level of war.

Additional training accomplished at Langley Air Force Base, within Numbered Air Forces, on location at operational AOCs, and at various Major Commands (MAJCOM), addresses specific regional and/or personnel requirements; however, the majority of training is accomplished, as outlined, at Hurlburt Field. Although contract civilians teach a large portion of the courses currently available at the Command and Control Warrior School, most of them are retired military officers with extensive AOC experience. Some on the faculty were active members of the Black Hole during desert Storm, and the retired General officers who regularly provide mentoring in various courses served as JFACCs in combat operations.[15]

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[15] Lt Gen Michael Short, and Lt Gen Joesph Hurd are extremely active in the development of AOC leaders at Command and Control Warrior School

Exercises also play an important role in the development of AOC leaders. By definition, exercises are closely related to training, yet they have several unique characteristics as well.

> An exercise is a maneuver or simulated wartime operation involving planning, preparation, and execution. It is carried out for the purpose of training and evaluation. It may be combined, joint, or single-Service exercise, depending on participating organizations.[16]

An effective exercise provides participants with education, training, and "simulated experience." Because experience is difficult to plan, exercises help supplement this requirement in the absence of war. "Exercises are designed to improve individual and unit skills, allowing forces to put into practice the concepts and methods they have studied."[17]

The education and training previously outlined requires a medium that allows officers to test their knowledge, apply their skills, and challenge their capabilities. Shortfalls or misunderstandings that inevitably occur in the development process of AOC leaders must be identified prior to application in war. The best, and safest, avenue is to allow AOC leaders to participate in realistic exercises. There are numerous exercises developed and executed across all the services. Participation in "air-centric" exercises allows leaders to apply and test their airpower C2 skills. The exercises that do not specifically address AOC processes still afford participants the challenge of projecting and managing airpower, which indirectly helps prepare airpower leaders for C2 within AOC operations. Following in Figure 15, is a short list of the available exercises currently maintained and executed at various intervals.[18]

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[16] JP 1-02, 151.
[17] AFDD 2-4.3, 30.
[18] Air Force Doctrine Document (AFDD) 2-1, *Air Warfare*, 2000, 66-67.

MAJOR US AIR FORCE AND JOINT EXERCISES

RED FLAG is a realistic combat training exercise employing the air forces of the US and its allies on the vast bombing and gunnery ranges at Nellis AFB NV.

GREEN FLAG is similar to a RED FLAG but emphasizes intelligence gathering, bomb damage assessment, and electronic warfare.

MAPLE FLAG is a combined US/Canadian Flag exercise held at Canadian Forces Base Cold Lake, Canada.

BLUE FLAG increases Air Combat Command's readiness by providing battle staff experience to numbered air force and other selected personnel in a realistic environment.

ROVING SANDS:

The primary focus of ROVING SANDS is joint tactical air operations. The exercise location is western Texas and southern New Mexico, primarily in the White Sands Missile Range and Fort Bliss, Texas areas.

AIR WARRIOR I:

Air Warrior provides realistic close air support, air interdiction, and airborne forward air control training in a simulated brigade-level conflict conducted at the US Army's National Training Center.

AIR WARRIOR II:

Air Warrior II is designed to provide realistic close air support, air interdiction, and airborne forward air control training, in a simulated low to mid intensity conflict at the US Army's Joint Readiness Training Center.

UNIFIED ENDEAVOR:

Unified Endeavor is a US Joint Forces Command exercise designed to train a joint task force commander/staff and joint task force component commanders/staffs on joint task force operations.

INTERNAL LOOK:

Internal Look is a US Central Command directed battle staff exercise designed to train a joint task force commander/staff.

JOINT TASK FORCE EXERCISE:

Joint Task Force Exercise is a Chairman of the Joint Chiefs of Staff approved, US Joint Forces Command scheduled, component-sponsored, field training exercise employing Army, Air Force, Navy, Marine Corps, and Special Operations Forces elements in a littoral environment off the east coast of the United States.

Figure 15

This section presented the major education, training, and exercises available that directly and indirectly support AOC leadership development. Analysis of the available development mechanisms reveals a number of successes, as well as several concerns. Section 2 highlights the results of examining the available education, training, and exercises outlined in this section.

ASSESSMENT

During the process of developing this study, several issues surfaced regarding the current state of AOC leadership development. This research illuminated seven broad conclusions in regards to the current development of officers for AOC leadership positions—three successes, four concerns. The methods used for assessing current AOC leadership development included the examination of doctrine, current AOCCONOPS and instructions, and nearly twelve hours of taped interviews with various senior officers and AOC developers. Because some sources and contacts were possibly biased by personal or institutional agendas, this study diligently checked and balanced each conclusion using a variety of resources.[19] This information continually highlighted each of the seven conclusions presented in this section.

The successful areas *effectively work to build AOC leaders.* This study does not identify every successful AOC development activity (they are numerous); however, presented are the three broad characteristics determined to have the greatest influence on AOC leadership development. The conclusions identified as concerns are those that *require proactive attention in order to improve AOC leadership development.* As with the successes, this study presents only the broad concerns that long-range development planners must address. Furthermore, although several of the identified areas focus beyond specific AOC leadership development, the consequences of these areas directly affect subsequent leadership development. The successes and concerns presented in this section are foundational to the concluding recommendations for improving AOC leadership development.

SUCCESSES

Through the examination of current AOC leadership development and future initiatives for change, three clear successes emerged. Each success repeatedly surfaced from various sources and contacts, providing evidence of their validity and accuracy.

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[19] When applicable, interview opinion and information was checked against doctrine, courseware, AOC instructions, and against the statements of additional interviewees. Every attempt was made to illuminate and retain only the conclusions that emerged across multiple sources.

Supporting each conclusion is primary source interviews, current documentation, and/or formally endorsed future initiatives.

SUCCESS ONE: **The AOC is declared an official weapon system.** On 12 September 2000, after three years of experimentation, General Ryan shared the following:

> I declare the AOC an official weapon system today. The AOC is now an official part of how the service will prepare for and conduct future expeditionary operations. During a real-world operation, the AOC will be the eyes, ears, hands, and legs of the commander. In each of our theaters, the ability of the air commander to execute the missions he has depends on the capability to have an AOC that [can be tailored]…for the mission he needs to do. The next step in the process is to identify the specialty codes, training pipeline, career path, and currency requirements associated with the AOC as a weapon system. We need baselining of the capabilities in that weapon system, just like we do in our capabilities in something like an F-16. [In an F-16], we have a crew chief that knows how to maintain it, and we have pilots that know how to fly it; we have to have the same concept for our AOC.[20]

This pronouncement paved the way for increased funding, standardization, and recognition of improved AOC personnel, technology, and processes. As with most military procurement, ideas and concepts are much more difficult to fund than are weapons. The formal "weaponizing" of the AOC provided regional CINCs and airpower leaders the required mandate to organize, train, and equip their AOC capabilities. The former Chief of the Air Force knew that the only way for the AOC to garnish the funding and detailed attention it required was to declare it a warfighting necessity—a weapon system.

This declaration was not in reaction to evidence observed only during the tenure of General Ryan as Chief of Staff of the Air Force; rather, this declaration came from the lessons learned during and since the Gulf War. Furthermore, this study previously showed that the historical lessons of airpower C2 directly defined current capabilities for today's AOC, therefore tying General Ryan's statements to enduring, historical, C2 concepts. Declaring the AOC an official weapon system encapsulated the continual call for airpower to be organized under one airman—theater-wide—across all services.

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[20] United States Air Force News Release, "AOC Declared Official Weapons System," Tech Sgt Stefan Alford, Release Number 000912-01.

Those who question the efficacy of declaring the AOC a weapon system fail to understand the tremendous operational authority and financial opportunities it provided.

Declaring the AOC an official weapon system subsequently encouraged increased attention for developing effective AOC leaders. This declaration did more for developing AOC leaders than any other single event. Although tremendous AOC organization and funded infrastructure had been progressing prior to General Ryan's statement, his official declaration institutionalized what had only been considered an evolving construct. Now it is clear: the projection of air and space power will be organized, planned, executed, and assessed by personnel within the AOC—development initiatives rightfully follow.

SUCCESS TWO: **Standardizing the AOC is an official mandate.** The words of General Ryan promoted the need "to identify the specialty codes, training pipeline, career path, and currency requirements associated with the AOC…."[21] However, prior to declaring the AOC an official weapon system, tremendous strides had already been accomplished in standardizing the AOC.

On 11 May 1995, Air Force Policy Directive (AFPD) 13-1, *Theater Air Control System* became official guidance. AFPD 13-1 established responsibilities and authorities for operations within the AOC by mandating that "the Air Operations Centers takes JFACC guidance as approved by the Joint Force Commander (i.e. apportionment decision) and develops the air campaign, allocates resources, and tasks forces through Air Tasking Order."[22] This policy directive set in motion a number of initiatives that provided direction and standardization for AOC development. The subsequent training and education required for officers selected to participate in the AOC also began to build formal standards.

On 1 October 1998, by order of the Secretary of the Air Force, Air Force Instruction (AFI) 13-109, Volume 1, *Ground Environment Training—Air Operations Center* became official, mandatory guidance and further implemented AFPD 13-1.[23] This AFI provided detailed instruction on the development of AOC personnel. The introduction to this instruction reads as follows:

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[21] Ibid.
[22] Air Force Policy Directive (AFPD) 13-1, *Theater Air Control System,* 11 May 1995, 1.
[23] Air Force Instruction (AFI) 13-109, Volume 1, *Ground Environment Training—Air Operations Center,* 1 October 1998, 1.

The purpose of this instruction is to provide the guidelines to train Air Operations Center personnel. The objective is to establish training policy, management criteria, and administrative practices to achieve and maintain Mission Capable (MC) status.[24]

AFI 13-109 provided detailed requirements for training and equipping AOC personnel including key leadership positions.

In June 1999, AFI 13-1AOC Volume 3, *Operational Procedures—Aerospace Operations Center* became formal Air Force guidance. Although similar in nature to AFI 13-109, this instruction offered detailed direction regarding overall AOC operations. By order of the Secretary of the Air force, AFI 13-1AOC:

> …implements AFPD 13-1, *Theater Air Control System,* and gives guidance in Air Force Doctrine Document (AFDD) 2 and the Presentation of Air Force Forces (formerly known as the Little Red Book). It provides guidance for the operation of an Aerospace Operations Center (AOC). It applies to the employment of AOCs and is designed to accommodate the use of manual, semi-automated, and automated ground/airborne elements of a Theater Air Control System (TACS). This document covers organization and operation of active, Reserve, Air National Guard, and coalition forces.[25]

Finally, in June 2000, then ACC Commander General John P. Jumper approved a draft AOC concept of operations that was the forerunner to General Ryan declaring the AOC an official weapons system (three months later).[26] This draft further focused the efforts of AOC developmental planners and provided additional standardization for the AOC. As presented in the introduction:

> This CONOPS serves as the basic guideline to organize, train, and equip the AOC to accomplish assigned operational missions, across the spectrum of conflict from peacetime shaping activities to major theater war. This CONOPS describes how airmen employ the AOC weapon system. The capabilities and processes described also provide a baseline from which programmers can build a roadmap for further development and corresponding acquisition and modernization strategies. This CONOPS applies to fixed and deployable AOCs tasked to support operational level command of aerospace forces. The references to AOC throughout the

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[24] Ibid., 4.

[25] Air Force Instruction (AFI) 13-1AOC, Volume 3, *Operational Procedures—Aerospace Operations Center,* 1 June 1999, 1.

[26] Air Force Concept of Operations For Aerospace Operations Center (AOCCONOPS), 7 June 2000, Office of Primary Responsibility (OPR), Aerospace Command and Control & Intelligence, Surveillance, Reconnaissance Center (AC2ISRC).

document apply as well to Joint AOC (JAOC) or Combined AOC (CAOC). This CONOPS defines the AOC as a weapon system that controls aerospace power. The CONOPS focuses on the operational level command functions required to employ aerospace forces. The CONOPS emphasizes the processes of the AOC, complimenting other Air Force documents that address organization and manning. This document provides linkage between doctrine, policy, and guidance outlined in applicable documents such as Air Force Instructions.[27]

The subsequent requirements for proper development of AOC leaders naturally followed. The statements by General Ryan declaring the AOC an official weapon system followed this draft CONOPS by ninety-days.

These instructions, together with the senior level endorsements, are evidence of the mandate to standardize AOC operations.[28] Currently, both AFI 13-109 (now 13-1AOC, Volume 1) and AFI 13-1AOC Volume 3 are undergoing considerable revision. In December 1999, a report announced the first official evaluation of an AOC; further promoting the need for measurable standardization.[29] Moreover, the January 2001 *Aerospace Integration Plan* specifically addresses future requirements for the AOC and outlines the integration initiatives for space operations into the AOC.[30]

The success of the AOC becoming an established, codified, system depends on the diligent development of AOC standards; this brief examination suggests initial success.[31] The importance of documenting this success rests in the subsequent determination that development of officers for leadership positions within the AOC is linked to, and closely follows, the standardization process.

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[27] Ibid., 1. This passage has been modified to adhere to formatting requirements in this document; however, no changes were made to content.

[28] For additional evidence on the mandate to standardize the personnel, technology, and processes of the AOC, see Colonel Joe May's comments (Chief of Centers and Process Integration Division, Aerospace Command and Control, Intelligence, Surveillance and Reconnaissance Center, Langley AFB, Virginia), "Air Force Moves Closer to Treating AOCs as Weapon System", *Air Combat Command News Service*, 19 May 2000.

[29] "Inspecting an AOC," *The Inspector General,* Nov/Dec 1999.

[30] *Aerospace Integration Plan, Toward A Full Spectrum Force*, Volume One, 5 January 2001 (Draft).

[31] Not cited in the body of this section, yet of clear relevance, is the inclusion of AOC operations and directives in Air Force and Joint Doctrine. (For example, reference AFDD 2, AFDD 2-1, JP 3-56.1, and JP 1-02. These are the major references, however, specific AOC guidance appears in numerous publications throughout Air Force, Joint, and Coalition documents.)

SUCCESS THREE: **AOC operations and leadership have greatly improved.**

In an interview, Major General David A. Deptula was asked how the AOC operations and personnel have evolved from the Gulf War to Operation Enduring Freedom (OEF):

> Personnel have had a significant change, notably, the improvement in the *quality of people* involved in planning air power operations. A good portion of that I can attribute to the recognition in the early 90s that we can use conventional airpower to accomplish strategic objectives. We began to recognize the importance of being able to control the evolving capabilities that were evidenced in technology, like stealth and precision, so therefore we began to talk about and put together courses like the JFACC course, the Senior Leader War Fighting Course, and SAAS. The School of Advanced Airpower Studies was not designed to produce technicians, but designed to produce strategists who can understand how to employ air power to achieve strategic objectives. In the recognition that command and control is extremely important, you saw the development of organizations; the Command and Control ISR Center stood up at Langley; the Command and Control Training and Innovation Group down at Hurlburt put together a CAOC to *train people how to operate in an AOC*. There was a *concerted effort to educate the* personnel that would be involved in air power operations throughout the period of the 90s…I think as a result of the effective application of air power during the Gulf War. *In Operation Enduring Freedom, you had a much more highly educated group of* personnel *running the CAOC*. There was a strategy planning cell already established. There was a Master Air Attack Plan cell already established. [In the Gulf War], there were huge disconnects and stovepipes that seriously affected operations between intelligence, current operations, and current plans. Those stovepipes, in many instances, had gone away and there was a much more seamless nature to the command and control organization in the CAOC as it existed in OEF, as opposed to Desert Storm.[32]

The observation of General Deptula is very important because he is the only officer on active duty today that led operations in the "Black Hole," on the first day of the Gulf War, and also became the AOC director for OEF. This unique experience has allowed General Deptula to reflect back to the operations in the Gulf War and directly compare them with those in OEF.

Additionally, when General Short was asked what the greatest strength of the AOC is, he quickly and emphatically responded, "I think the strength is the *quality of the*

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[32] Major General David A. Deptula, United States Air Force, interviewed by author, 31 January 2002. Italics added. Although not cited, his testimony on the quality of personnel in the OEF CAOC is corroborated (through informal interviews) by several additional officers who participated in and observed operations in the OEF CAOC.

people and training that they receive, [together with] the processes we have set up that moves an ATO through a cycle but still allows an ATO to be very, very flexible."[33] General Short supports the determination that current AOC leaders, properly trained, are better than ever before. The development process has produced officers who understand the complex capabilities of airpower C2 as it applies in today's AOC.

These three successes suggest the Air Force is taking the initial, appropriate steps to adequately organize, train, and equip the AOC. Declaring the AOC an official weapon system instigated further development and helped to validate AOC initiatives. Standardization of the AOC personnel, technology, and processes helps to institutionalize AOC operations and drives subsequent leadership development. Finally, recent combat operations and senior officer observations suggest AOC personnel and processes are improving—a credit to current AOC operations development. However, these three successes do not tell the entire story. Declaring the AOC a weapon system created numerous problems; standardizing AOC operations has created considerable discourse; and although AOC personnel are better today than they have ever been, airpower C2 operations are still characterized as a pick-up game.[34] These successes are a reflection of diligent planning and visionary thinking by airpower advocates; however, several AOC concerns require proactive attention in order for the Air Force to prepare officers effectively for AOC leadership positions.

CONCERNS

Examination and assessment of the current AOC leadership development uncovered several concerns that require proactive attention. This part of the study presents the four most important concerns, supplies supportive evidence, and frames the recommendations that follow this section.

CONCERN ONE: **A deliberate and accountable continuum for developing AOC leaders does not currently exist.** Unlike other weapon systems, there is not an established path that is designed to develop potential AOC leaders. Although AFIs exist,

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[33] Lt Gen Michael C. Short, United States Air Force, interviewed by author, 16 December 2001. Emphasis added.
[34] This particular comment, "current airpower C2 operations are characterized as a pick-up game" was made by several of the senior officers, and will be formally presented further along in this section under areas of concern.

spelling out what certain positions in the AOC require, they are ambiguous and rarely followed. AOC leadership personnel are often selected and placed into action without specific AOC development opportunities accomplished. In comparison to other weapon systems, this is equivalent to asking a KC-10 pilot to strap into an F-16 without any formal F-16 preparation. In the F-16 example, the consequences and crash site are obvious; however, the consequences in the AOC are not nearly as distinguishable. Effective measurement of degraded and inefficient AOC operations caused by AOC leaders without sufficient and required skills is elusive and often subjective.

Some may argue that because the Air Force has won all its recent conflicts, there is no need for improvement. However, closer examination shows that all recent US conflicts have had the opportunity to "build-up" and prepare for combat operations before hostilities began. The US has had the advantage of deciding when and where the fight will take place, allowing the Air Force to prepare AOC personnel, technology, and processes. In contrast, if a belligerent were to bring an aggressive, offensive conflict to the US without warning, would the AOC and its personnel be prepared? Would a no-notice scenario catch the Air Force off-guard? The US cannot afford to find out, and instead must proactively develop a deliberate, accountable continuum that prepares AOC leaders for an uncertain future.

In response to a question asking if current education and training is effectively preparing officers for AOC leadership, General Short commented:

> No it's not. ACSC doesn't prepare you for that. Most of us who go to the Air Staff or Joint Staff or the ACC Staff aren't being prepared for that. You show up in the AOC as a colonel, as the Chief of Combat Ops, or the Chief of Combat Plans. Most colonels are good people and they'll survive, but they weren't prepared for that process… I ended up as a jack-of-all-trades and the master of none. I spent some time in the AOC as a major but then when I was a full colonel I was chief of requirements at ACC or whatever. So things have got to change… How well did the AF prepare me to command and control airspace power? Not well at all. I never went to the JFACC course, never ran one Blue Flag in my life…I'd been a wing commander several times but had nothing to do with command and control of airpower. Had more to do with providing forces… But I arrived at AIRSOUTH and 16th Air Force and

COMSOUTH after having received no formal training from the USAF on how to command and control airpower.[35]

Additionally, General Short was asked: Do you have any ideas, suggestions, or concerns regarding the current and future education and training system for developing AOC leaders? Any trends that are of concern to you? You mentioned something about having a follow on Chief, after the current Chief, that needs to be in line with this…

> Oh, yea. We haven't gotten it started yet. We're waving our hands and running around holding a banner saying AOC is a weapons system, but nothing's happened yet. We'll be at the two-year point of Johnny's [General Jumper] time as the Chief before we get some type of an RTU [Replacement Training Unit] or something ready to go. And we'll be well beyond the 2-year point of his time as Chief before you and your peer group are convinced that going to an AOC does not kill your career so, there has to be a follow-on.

The two questions and responses indicate that General Short agrees that a deliberate and accountable development continuum for AOC leaders does not currently exist. General Hurd offered the following comment when asked about any concerns he has regarding AOC leadership education and training:

> …we need to get to the position down here [AOC development at Hurlburt Field] were it needs to be funded enough that you can't go to an AOC unless you go to a checkout point. I think we're only training 40 percent of the people to go to the AOC. I don't send F-16 pilots to Kunsan without training. I've got to do the same for AOCs. So there needs to be some more dollars and resources put into this so I can put everybody through a pipeline enroute. If it's your first [AOC] tour, then longer, if it's your second maybe less.[36]

Even more telling is the comment made by the Commander of the Command and Control Warrior School at Hurlburt Field, Lt Col Michael Rollison, when questioned about the efficacy of the current AOC personnel development system, both from a personal and institutional perspective:

> …everyone that goes to an AOC does not come through my course. So we still have individuals that are going to an air operations center, working in an air operations center that have never been trained in an air operations center. That's going to change. The Chief of Staff of the AF has designated the AOC as a weapons system. We are building a Formal

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[35] Short interview.
[36] Lt Gen Joseph E. Hurd, United States Air Force, interviewed by author, 28 November 2001.

Training Unit (FTU) for this new weapon system right now. Everyone who assigned to an AOC will attend prior to PCSing to the unit. All personnel will come out of the FTU Basic Mission Capable (BMC) and will receive Mission Qualification training (MQT) at the unit. After they are MQT, all personnel will receive continuation training to remain current and qualified in the AOC.. I have worked in strategy, GAT, and in the MAAP, and the only way I was able to learn how to do that was through experience—the on-the-job training that I had—and some of it had to be done quickly….[37]

All of the interview comments presented here support the determination that a deliberate and accountable continuum for developing AOC leaders does not currently exist. Follow-on comments did suggest that there are focused initiatives that are currently attempting to resolve this problem. Most of those interviewed believed that a deliberate development continuum is forthcoming in the near future. Additional research suggests their optimism is well founded and a deliberate development system is under construction.[38]

Furthermore, education, training, and exercises for potential AOC leaders are not integrated. The PME offered at AU has no deliberate interaction with the curriculum at Hurlburt (with the exception of ASBC). AOC exercises (such as Blue Flag) connected with training at Hurlburt are not coordinated with educational activities at AU. Integration is the "buzz word" used for future airpower operations; however, integration must begin in our education, training, and field exercise classrooms. From Second Lieutenant to General, effective AOC leadership development requires seamless integration across the training offered at Hurlburt, the various exercises, and the education at AU.

CONCERN TWO: **AOC leaders at the Colonel level and above have not served in an AOC before, while AOC leaders at the Lt Colonel level and below risk non-promotion.** This research quickly discovered a two tiered, or "glass ceiling" exists

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[37] Lt Col Michael Rollison, United States Air Force, interviewed by author, 29 November 2001. Emphasis added. Lt Col Rollison is currently (as of the time of this study in the winter of 2002) the commander of the Command and Control Warrior School at Hurlburt Field. He worked alongside General Short in the CAOC for Operation Allied Force.

[38] Additional assessment on this concern is covered in the recommendations section. Note, however, that a great work is being accomplished at Langley, AETC, Hurlburt, and to some extent, AU regarding this problem. This particular conclusion, although valid, is not something AOC developers and long-range planners are unaware of. All those interviewed acknowledged the lack of a deliberate system to develop AOC leaders; however, they also made mention of numerous proposals and initiatives working to correct the problem.

for current AOC leadership positions. If the AOC were like most weapon systems, operators would be required to have significant, progressive, experience in the system over a span of several years. Leaders would be identified as experts in the system who also show potential for command. However, in the AOC, if you are a Colonel or a General Officer, then your rank alone means you have never been in, nor had any experience in, an AOC. Why? Because if you had been in the AOC earlier in your career, you would not have been promoted above the rank of Lt Colonel. AOC positions do not get officers promoted. In an *Airpower Journal* article, "Command and Control—The Truth," Lt Col Byron Dodgen addresses the following questions:

> At the root of the C2 issue is a basic personnel problem. Why can't one find enough AOC-smart people to man a battlelab? Why are there so few AOC-smart people on key staffs? Why doesn't leadership understand the process, and hence, the real issues?
>
> The answer is a Catch-22. Look around and find any colonel or above who served in an AOC as a company or field grade officer (prior to becoming an O-6). The reason you will not find any of these types is a Catch-22 that exists in the Air Force. If you serve in a C2 position, your career is usually dead-ended. Many fine officers find themselves in a non-advancement situation and retire. Those who manage to escape back to a cockpit or another promising job immediately begin to hide the fact that they ever existed in the C2 world because they darned sure don't want to go back. AOCs are not full of deadheads—the Air Force just thinks they are. So now comes the Catch-22. Who has to make the key decisions and take the key actions to fix the problem? You guessed it—a lot of senior leaders who have never served in the mission area. They wouldn't be senior officers if they had![39]

This assertion is not unique to Lt Col Dodgen. General Hurd, when asked how the Air Force can best prepare officers for AOC leadership positions, commented:

> … we said you've got to have more than one tour in an AOC. You can't just come in it one time—and we do this on purpose because anybody who does two tours is going to retire as a lieutenant colonel or colonel at best. We've only promoted one guy to brigadier—and that's Al Patton from an AOC, that I can think of, in the modern times since the 90s… The paradigm shift is you've got to make the AOC a promotable position so that people can perceive they can compete…. My number one will always

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[39] Lt Col Byron Dodgen, "Command and Control (C2)—The Truth," *Airpower Journal*, April 1997, n.p., on-line, Internet, 19 October 2001, available from http://www.airpower.maxwell.af.mil/airchronicles/cc/dodgen.html.

get promoted but I don't compete with the number 2s and 3s. So I can take care of the sharpest. But the perception is that if you're not the sharpest don't come there [AOC] because a 2 [in an AOC] or in a Numbered AF versus someone at the Pentagon is not a match. Until we change that perception, we are not going to get good people who want to go out there [to an AOC].[40]

Lt Col Rollison also supports this assertion:

We need to break the paradigm…promotions and upward mobility needs to be there if we want the best and the brightest in the AOC working the strategy development for the JFACC, building GAT, MAAP, and the ATO, and finally executing the ATO in Combat Operations…[41]

Lt Col Rollison, General Hurd, and Lt Col Dodgen express a serious concern associated with the AOC. When a squadron commander is asked to send someone off to the AOC, he will probably not send his best person. He knows the AOC will not do his best officers any favors in terms of career progression. So, instead of his best, he sends the officer who may already be challenged for promotion. As each wing or squadron commander goes through this same ritual, the AOC ends up being manned by the 3rd and 4th string officers. When promotion board results then show that no one in the AOC got promoted (due to the low caliber of the records before they were placed in the AOC), the perspective develops that the AOC is a bad place to be.

As the low promotion rates within an AOC continue to encourage commanders not to send their very best, airpower command and control suffers. What most commanders fail to realize is the officer they send to the AOC will have increased authority over aircraft in war. AOC personnel select the targets, build the attack plan, and develop the ATO. The officers in charge of these crucial activates need to be the very best the Air Force can produce. Developing AOC leaders must start with the very best officers, or AOC operations will suffer. In the current system, AOC leadership development is doomed before it ever gets started. The officers who need to be selected for command and control duty, the sharpest in the squadron, are not. Worse, the officers selected for the top AOC leadership positions (those at the Colonel and above rank) have

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40 Hurd interview.
41 Rollison interview

had no AOC time, limited development at the operational level of war, and limited airpower command and control experience.

CONCERN THREE: **Not everyone can attend PME and AOC training at Hurlburt, yet there is minimal AOC Distance Learning (DL) available for officers at any rank.** The problem is that the amount of education and training required of officers to fill leadership positions is immense. Attendance at ACSC does not usually occur until an officer's twelfth to fourteenth year of service—if at all. From the time an officer attends ASBC as a new second lieutenant, to the time he attends ACSC, as many as fourteen years have already been served. With limited AOC DL program, there is little opportunity for officers to receive the education needed for airpower command and control leadership. An effective AOC DL program would allow young officers to gain knowledge over a longer span of time, and at a pace they could determine. No further evidence for this concern is needed, in that there simply is not an adequate AOC DL program available, nor is there any significant initiative to develop one anytime soon.

CONCERN FOUR: **AOC instructions are ambiguous and lack authoritative language, possibly producing wide variations and loose interpretations.** The inherent power of standardizing a complex system is the development of an authoritative document that mandates specific criteria. This is not a call for rigid operations or inflexible applications; rather, instructions must give basic direction using authoritative language to ensure commonality in basic operations or criteria. For example, using the words "will," or "must" as in "you will/must," requires a specific action or pre-determined criteria be met. The words "may" or "should," reflect an operation or criteria whose adherence is not necessarily mandatory. The problem arises when the latter words (may or should) are substituted for the former (will or must) for inappropriate reasons. This research has determined that the abuse of these words in the development of AOC instructions, and even command and control doctrine, is possibly intentional—to make an "easy out" in cases where compliance would be difficult. (Difficult used here in the negative sense, that is, difficult to get someone to change when they have always done it a certain way.)

Examination of this assertion begins by analyzing words used in current Air Force Command and Control Doctrine, Air Force Doctrine Document (AFDD) 2-8, dated 16

February 2001. In chapter four, "Equipping and Preparing Command and Control Operators," the language begins authoritative:[42]

> - To employ C2, operators *require*…focused training.
> - Commanders *must* ensure their people are fully proficient at using designated C2 systems…
> - To deliver peak performance, individuals *must* develop and maintain proficiency in the operation of C2 systems…
> - C2 training *must* encourage flexibility of thought

However, as specific direction calls for action, the language changes. The previous ideas that seemed so very important begin to lose their authoritative thrust by the end of the same chapter.[43]

> - Operators *should* receive a common core of C2 training…
> - C2 system application training *should* be an integral part of each new C2 system…
> - …the Air force *should* consider training requirements co-equal with operability…
> - NAF commanders, as potential joint task force commanders and JFACCs, *may* require senior-level C2 training.
> - Airmen likely to serve in AOCs or similar organizations *should* receive appropriate…C2 training.
> - Generally, experience-appropriate C2 training *should* become an integral part of normal career progression of all airmen.

These are only a few of the numerous examples found in this doctrine document. Would it not be accurate to say, for example, "Airmen likely to serve in AOCs or similar organizations ~~should~~ **must** receive appropriate…C2 training. Is there actually a case where an airman would not need appropriate training? The word must or will can be used in all of the cases above, giving the doctrine consistency and ensuring guidance is not interpreted incorrectly—out of convenience. If the words "will" and "must" were

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[42] Air Force Doctrine Document (AFDD) 2-8, *Command and Control,* 16 February, 2001, 43-45, Italics added.
[43] Ibid., 43-45, Italics added.

used previously, why not here as well? This same word choice is intentionally used throughout AOC instructions—out of convenience.

At a recent rewrite symposium for the AFI 13-1AOC volumes, a word by word analysis took place over the period of a week. Observations of the rewrite and discussion processes, as part of this research, developed supportive evidence for the assertion that AOC instructions intentionally use ambiguous language for AOC instructions. Although the transcripts supporting this assertion are extensive, a brief sample of the discussions will serve the point.

In the original draft of AFI 13-1AOC Volume 1, *Ground Environment Training— Aerospace Operations Center*, numerous directives used the terms "will" and "must." As the discussion opened up to the floor (approximately fifty military and civilian personnel), the debate over using these "authoritative words" began. Several participants in the debate argued that current AOC personnel would no longer be considered mission ready if the verbiage in the AFI is not "should" or "may." For example, one line in the AFI said an "AOC instructor *must* have a minimum of one year AOC experience." Several participants raised the objection that if the requirement stayed as written, they would have to downgrade most of their current instructors. The solution adopted was to change the word from *must* to *should.* This same change occurred at least twenty times before the author stopped counting over the course of the week.[44]

Rather than build a transition time into the process and provide current AOC personnel the needed time to meet new standards, lowering of the standards to match the criteria of current personnel became the solution. The word "should" allowed interpreters of the AFI to ignore important criteria altogether. The importance of standardizing criteria, such as the experience needed to become an instructor, goes to the heart of developing AOC leaders. If the standards float, determining the criteria and defining leadership positions will be extremely difficult.

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[44] The author attended this AFI rewrite at Hurlburt. The count of twenty was based on only a few hours of observing on the first and second days.

Figure 16 summarizes the areas of success and concern.

RESEARCH CONCLUSIONS

SUCCESS ONE:	**The AOC is declared an official weapon system.**
SUCCESS TWO:	**Standardizing the AOC is an official mandate.**
SUCCESS THREE:	**AOC operations and leadership have greatly improved.**
CONCERN ONE:	**A deliberate and accountable continuum for developing AOC leaders does not currently exist.**
CONCERN TWO:	**AOC leaders at the Colonel level and above have not served in an AOC before, while AOC leaders at the Lt Colonel level and below risk non-promotion.**
CONCERN THREE:	**Not everyone can attend PME and AOC training at Hurlburt, yet there is no AOC Distance Learning (DL) available for officers at any rank.**
CONCERN FOUR:	**AOC instructions are ambiguous and lack authoritative language, producing wide variations and loose interpretations.**

Figure 16

RECOMMENDATIONS

In order to best prepare officers for leadership positions in the AOC, the final section of this chapter presents ideas and recommendations for exploiting the successes, and addressing the concerns. The concerns outlined in section 2 are not new issues to current AOC developers and planners. The value of presenting them in this research is that they were developed from an unbiased source, outside of any formal AOC mandate or contracted investigation. This "outside look" reinforces what most AOC planners have known for some time; however, this research codifies the concerns and hopefully provides further evidence for future AOC improvement initiatives. This section offers recommendations and considerations for addressing each of the previously presented concerns; fortunately, solutions for the concerns can begin by exploiting the three successes.

Success number one (the AOC is declared an official weapon system) provides the foundational solution for concern number one: A deliberate and accountable continuum for developing AOC leaders does not currently exist. Every weapon system

provides a central agency that manages and tracks personnel qualified in the system. At the Air Force Personnel Center (AFPC), every weapon system is represented by an "assignment manager" who tracks qualified personnel for their system; the AOC as a weapon system requires the same representation. Official, authoritative guidance must require and empower AFPC to select only qualified officers for specific AOC positions. Assignments within other weapon systems are not handled at the squadron or wing level; rather, AFPC has final assignment authority. This allows a centralized agency to judiciously manage the needs of the system—assigning qualified officers to specific positions. The AOC weapon system requires the same level of attention.

Furthermore, because the AOC is now a weapon system, development of officers must be standardized across education and training. A working group must be established with representation from each PME school at Air University, CADRE, and AFC2TIG at Hurlburt Field to develop a deliberate continuum of education that dovetails with training. This will require a paradigm shift from how the Air Force has traditionally perceived education and training. Air Training Command was renamed Air Education and Training Command for the very reason of integrating education and training together under a single command; however, integration of the two rarely occurs, and is less often deliberate when it does. If the Air Force is serious about developing future officers, capable of commanding at the operational level of war, airpower C2 education and training must be deliberately integrated under a specific continuum; coordination among Air University and Hurlburt is required.

Finally, the unique characteristics of the AOC weapon system require a departure from traditional "pipeline" training. In an F-16, a new Second Lieutenant must first attend a year of pilot training, attend F-16 FTU, and accomplish numerous training activities before being considered mission qualified. After several years of building experience and considerable additional training, the F-16 Captain then upgrades to instructor pilot and possibly flight commander within his/her squadron. This "pipeline" continues until, at the grade of Lieutenant Colonel, the officer is possibly ready to be an F-16 squadron commander. This is not realistic for personnel within the AOC weapon system. A pipeline, as presented, illustrates a closed system with only vertical movement. The AOC, by definition, is an amalgamation of numerous air and space

capabilities that require leadership across a wide spectrum of operations. Rather than a closed "pipeline" perspective, the AOC weapon system requires a "spiral" system. A spiral system would require officers to become proficient in their primary system, as described above, however, deliberate education, training, and actual duty in an AOC would be incorporated into an officers development process. Officers from the rank of Second Lieutenant to Colonel would "spiral" in and out of appropriate AOC education and training as their careers progress—preparing them for AOC leadership positions when the need arises. Because the AOC is now an official weapon system, these recommendations are both appropriate and possible. Implementing these recommendations will begin to solve AOC leadership development problems, and promote future airpower C2 effectiveness.

Success number two (Standardizing the AOC is an official mandate) provides a partial yet foundational solution for concerns three and four: Not everyone can attend PME and AOC training at Hulbert, yet there is no AOC distance learning available for officers at any rank; and AOC instructions are ambiguous and lack authoritative language, possibly producing wide variations and loose interpretations. Both of these concerns can be addressed by exploiting the mandate to standardize AOC operations.

Addressing concern three, every AOC has the same basic structure and capabilities. Although each AOC has unique characteristics due to mission tasks and geography, each still process the same basic capabilities—C2 of air and space power. In order to ensure wide education of AOC specifics across the entire Air Force, a DL program must be developed. This need not be an intrusive, complex program. A simple proposal is the development of an interactive CD that contains all of the general AOC required education. The contents could be tailored, organized within different folders, to address specific grade/rank requirements. The objective of this education medium is to develop, across the Air Force, an *appreciation* and *awareness* for air and space C2, and AOC specific knowledge. Just as computer security requires each participant to understand specific requirements and then tests for accountability of the information, this AOC development CD could present material and test participants. Those officers accomplishing the required portions of the DL would be tracked just as any other weapon system tracks required training (chemical-gear, altitude chamber, instrument refresher,

etc.). Although the intention is AOC *appreciation* and *awareness,* not mastery or expertise, this simple DL program would offer initial AOC education to the entire Air Force (as well as other services). Exploiting the mandate that calls for AOC standardization produces the authority behind this proposal, and further encourages Air Force wide understanding of AOC operations.[45]

In regards to concern four, AOC instructions are ambiguous and lack authoritative language, possibly producing wide variations and loose interpretations, the best solution is to develop instructions the same way aircraft manuals are developed. With the precursor, "This instruction does not take the place of good judgment," AOC instructions must clearly spell out specific requirements. Granted, each AOC will have unique requirements; however this can be solved by individual AOCs developing supplements to the basic instruction—just as is the case in other weapon systems (aircraft operations for cold weather, desert conditions, etc.). The instructions must require specific qualifications or individual AOCs will not comply. Any personnel currently in active AOCs can be placed into a "transition" status that enables them to continue their duties (instructor, manager, etc.) without having the required qualifications specifically or formally met. However, during this clearly defined transitional period, AOC personnel must proactively begin formal qualification procedures. New AOC personnel will not fall under the transition program; rather, they will enter into the standardized qualification procedures. Over a short period of time, the personnel in the transition program will either meet standard qualifications, or they will have moved back into their primary weapon system. Eventually, the new AOC personnel will have replaced all current AOC personnel and the transition program would end. Bottom-line: write the AOC instructions to spell-out clearly and authoritatively the requirements for AOCs and allow current AOC personnel a transition period. Exploiting the mandate calling for AOC standardization will drive authoritative AOC instructions and subsequently affect AOC leadership education and training development.

Success number three (AOC operations and leadership have greatly improved) provides the foundational solution for concern two: AOC leaders at the Colonel level and

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[45] For an excellent example of the type of program this recommendation mirrors, reference the "Aerospace Power Course" developed and managed by CADRE. This course is a self-paced, interactive CD that includes two small books. It is easily updated, and requires very limited funds to produce and disseminate.

above have not served in an AOC before, while AOC leaders at the Lt Colonel level and below risk non-promotion. This concern is perhaps the gravest of all concerns presented. If officers do not perceive the AOC to be a forward, upward moving, career enhancing opportunity, the AOC will forever be plagued with other than first team leaders. The Air Force must mandate equal promotion opportunities for AOC personnel (for example, equal to that of Air Force Staff) to draw highly capable officers. Standardizing operations within the AOC will begin the process of developing personnel whose abilities and job performance can be stratified and measured against a "standard" of excellence. Officers identified as diligent, professional, AOC experts (within their area of expertise), must be rewarded for their C2 skills.

Furthermore, select AOC positions should be command billets (91C) that allow officers on the command track to fulfill command requirements in the AOC weapon system. There is no weapon system, except for the AOC, that does not have associated commander billets—the AOC must offer command opportunity. If the Air Force requires highly capable officers to filter in and out of the AOC, promotes AOC officers at the highest comparable rate, and develops command billets within the AOC, future AOC leaders will be first team, highly qualified officers.

One final consideration is to require officers to have served at least one tour in an AOC before being eligible for promotion to Brigadier General. Just as a joint tour is mandatory for promotion to general officer, the Air Force could require that all of their general officers be experienced in the command and control of airpower at the operational level of war. This sounds fairly drastic, however, if the Air Force is serious about developing future leaders capable of commanding airpower in war, this must become a requirement. It sounds equally absurd to think that in today's current Air Force, officers can reach the rank of general and not understand the projection, command, and control of airpower. By definition air and space power is the foundation of the United States Air Force mission; no airman should be afforded the rank of flag officer that is not a competent and fully capable airpower command and control leader—a master of air and space power. Because the Air Force has chosen the AOC to be the vehicle that projects its air and space power, then logically, Air Force officers who reach the highest grades must be competent within the AOC weapon system.

CONCLUSION

The conclusions and proposed recommendations presented in this chapter highlight two major issues. First, the AOC as a system for C2 of airpower is diligently progressing and making tremendous improvements. The Air Force is better prepared today than ever before to project air and space power around the globe, in a variety of possible situations. AOC developers and planners are producing personnel, technology, and processes that continue to meet the dynamic needs of today's air and space power requirements. Second, in order for the Air Force to best prepare officers for AOC leadership positions, several additional areas must be improved. AOC education and training must be integrated within a deliberate continuum, personnel must be managed under a new spiral development system, and increased opportunity for AOC personnel promotion must immediately be implemented. In summary, the four concerns and subsequent recommendations are presented in Figure 17.

RECOMMENDATIONS

CONCERN ONE

A deliberate and accountable continuum for developing AOC leaders does not currently exist.

RECOMMENDATIONS

- **Official, authoritative guidance must empower AFPC to select only qualified officers for specific AOC positions.**
- **A working group must be established with representation from each PME school at Air University, CADRE, and AFC2TIG at Hurlburt Field to develop a deliberate continuum of education that dovetails with training.**
- **Rather than a closed "pipeline" perspective, the AOC weapon system requires a "spiral" system. A spiral system would require officers to become proficient in their primary system, as described above. However, deliberate education, training, and actual duty in an AOC would be incorporated into an officers development process.**

CONCERN TWO

AOC leaders at the Colonel level and above have not served in an AOC before, while AOC leaders at the Lt Colonel level and below risk non-promotion.

RECOMMENDATIONS

- **The Air Force must mandate equal promotion opportunities for AOC personnel.**
- **Select AOC positions should be command billets (91C) that allow officers on the command track to fulfill command requirements in the AOC weapon system.**
- **Require officers to have served at least one tour in an AOC before being eligible for promotion to Brigadier General.**

CONCERN THREE

Not everyone can attend PME and AOC training at Hulbert, yet there is no AOC Distance Learning (DL) available for officers at any rank

RECOMMENDATION

- **Develop an interactive CD that contains all of the general AOC required education. The objective of this education medium is to develop, across the Air Force, an *appreciation* and *awareness* for air and space C2, and AOC specific knowledge.**

CONCERN FOUR

AOC instructions are ambiguous and lack authoritative language, possibly producing wide variations and loose interpretations

RECOMMENDATION

- **Write the AOC instructions to spell-out clearly and authoritatively the requirements for AOCs and allow current AOC personnel a transition period.**

Figure 17

Chapter 5

Conclusion:

Developing Airpower Leaders for an Uncertain Future

Hannibal, Caesar, Heraclius, Charlemagne, Richard, Gustavus, Turenne, Frederick, Napoleon, Grant, Lee, Hindenburg, Allenby, Foch, and Pershing were deeply imbued with the whole knowledge of war as practiced at their several epochs. But so were many of their defeated opponents; for as has been pointed out, the success in war lies not wholly in knowledge. It lurks invisible in that vitalizing spark, intangible, yet as evident as the lightening—the warrior soul.

—Major George S. Patton, Jr., Calvary
Success in War

This study set out to determine how the Air Force can best prepare officers for AOC leadership positions. Today's AOC is the central weapon system for projecting, managing, and executing airpower to meet national objectives. Today's AOC is designed to provide airpower command and control required for effective military operations. In order to analyze the current AOC leadership development process, an investigation into the relevancy and sufficiency of today's AOC capabilities became paramount. This required an investigation into the historical precedence and enduring lessons of airpower C2. Figure 18 illustrates the development process by showing that historical concepts

DEVELOPMENTAL PROCESS CYCLE
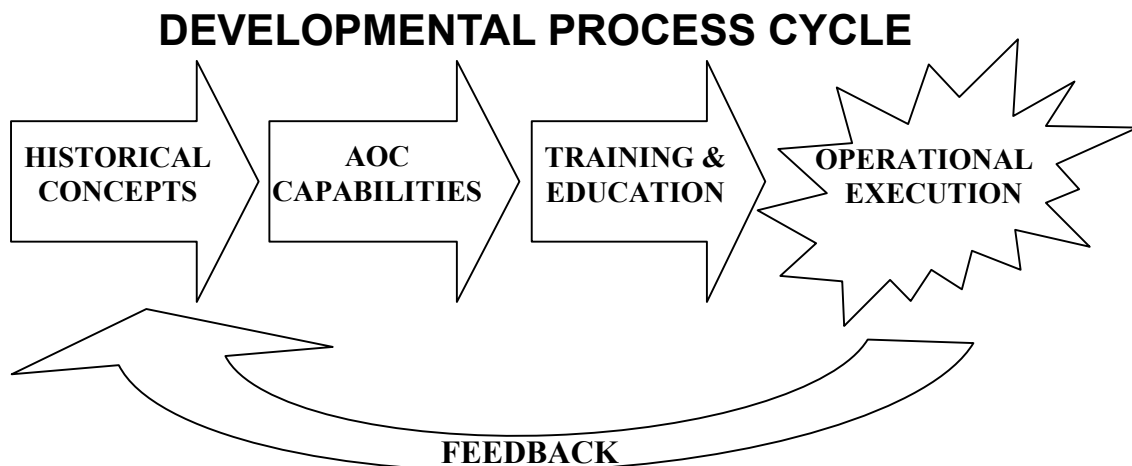
Figure 18

must determine current AOC capabilities, which in turn drive the education and training that prepares leaders for operational execution. Therefore, this study began with an historical investigation of airpower C2. The historical lessons were then compared to current AOC capabilities with the resulting conclusion that today's AOC capabilities sufficiently incorporate the enduring airpower C2 lessons developed over the past century. Once it was determined that current AOC capabilities were grounded in historical precedence and enduring concepts, this study analyzed the available education and training for developing AOC leaders. The analysis found three successful areas and four areas of concern followed by recommendations and possible solutions.

The overarching conclusion of this study is that the Air Force can best prepare officers for AOC leadership positions by first developing a deliberate continuum of education and training, uniquely tailored for today's airpower C2 requirements. Although the focus of this study is framed around developing AOC leaders, the larger issue is developing leaders for airpower C2 (of which the AOC is a major subset). AOC education and AOC training must be integrated and considered co-dependant when being developed. Each officer grade must have deliberate AOC education and training that continues to build throughout their career, culminating in leaders who can effectively C2 airpower at the operational level of war within the AOC weapon system. Recognition of the importance of capable AOC personnel must result in equal promotion rates and command opportunities. Developing airpower C2 leaders who can synthesis the complex requirements of war with the technology developed for its execution is vital in preparing for an uncertain future. The officers who have diligently gained the skills for airpower C2 must be properly managed to ensure effective readiness when conflicts arise.

During the research phase of this study, several questions that directly affect airpower C2 (beyond what the initial scope of this research had anticipated) continually surfaced. At what level of leadership should we draw the line between centralized control of airpower and decentralized execution? What level of airpower expertise should be mandatory in order to have final decision authority in an air war? Should we appoint an airman (airpower expert) as the JFC or give the JFACC final authority over airpower execution if the principle military arm in a war is airpower? The consideration of these important questions together with the initial intentions of this research made it

clear that there are two major aspects for consideration of effective airpower C2. The first, which is the scope of this study, is looking at how the Air Force can best prepare officers to meet AOC leadership requirements by examining the "AOC down." (AOC down refers to the personnel, technology, and processes within the AOC.) The second, which is equally important but beyond the scope of this research, focuses on the aspect of effective airpower C2 requirements by considering the "AOC up." (AOC up refers to the personnel, technology, and processes at the level of the JFACC and above.) AOC up involves the relationships among the flag officers and select high-ranking civilians who directly affect the execution of war.

Although there is very little official documentation regarding Operation Enduring Freedom (OEF), initial investigation reveals that the "AOC down" ran extremely well, while the AOC up developed tension and raised significant command and control questions. In OEF, the JFC remained at his peacetime location within the United States. Although the JFC had continual contact with the theater operations of the AOC, its JFACC, and director, considerable questions arose regarding the "displaced" chain of command. Although technology (Video Tele-Conferencing, secure communications, etc.) allowed the JFC to remain in Central Command's Florida Headquarters, significant concerns are worthy of consideration. The JFC was able to go home at night to his own family, deal with family relationships, continue daily routines (house chores, church, family sporting events, etc.) while the JFACC and other theater leaders fought a twenty-four hour war. There is a difference between the warrior mindset that is plugged into the war every minute of the day (JFACC in OEF), and the mindset of one who must shift priorities throughout the day between "normal" responsibilities, family ties, and war decisions (JFC in OEF). Personal operational tempo, face-to-face discussions, and the constant warrior focus can only be achieved when one is placed in an environment that disables the normal peripheral responsibilities associated with peacetime operations. What effect did this "displaced relationship between the JFC and the JFACC have? Initial investigation suggests an environment characterized by tension, miscommunications, and less than optimum trust.

Furthermore, over the last decade, military operations have been predominantly characterized as "air wars," yet the highest military authority has yet to be an airman.

From Desert Strom to OEF, an Army officer has had final authority of US conflicts. Given the fact that airpower has consistently been the dominate force, how has airpower command and control been affected by having a "ground" expert in charge of an air campaign? During Allied Force, significant disagreement between the Army JFC and the Air Force JFACC plagued what should have been professional, efficient operations. Initial investigation suggests that OEF was plagued with similar conflicts between the JFC and the JFACC. Some might argue that the JFC must be an Army officer because the war is not over until the ground troops move in; this reasoning is not supported by recent history, nor is it current thinking of those planning possible future contingencies. Moreover, it is doubtful the Army would ever allow an Air Force officer to have controlling authority over a war that, from the start, is principally a ground campaign. The ramifications of having a ground officer in charge of an air campaign are equally unacceptable.

Further research must be accomplished regarding the "AOC up" organizational structure for future conflicts. This research did not specifically investigate possible "AOC up" concerns; rather, "AOC up" issues continually surfaced throughout the investigation of "AOC down" processes. Clearly, the decisions above the level of the JFACC directly affect the operations within the AOC—this is how it should be. However, the question is what level of airpower expertise must the US require of its leaders before they are placed in decision making positions above the JFACC? More specifically, should the JFC be an airman when the principle force is airpower? As more official information regarding OEF becomes available, diligent research will be required to answer these and several additional "AOC up" questions that directly affect AOC operations—and ultimately—AOC leadership development. For now, current initiatives must focus on improving the development of leaders for AOC specific requirements. However, as Patton implied, great military leaders require not only knowledge and skill, but also that inner voice that comes only from the warrior soul.

Appendix A

PART - 1 ACRONYMS AND ABBREVIATIONS[1]

A

A2C2	Army airspace command and control
AA	attack assessment
AAA	antiaircraft artillery
AADC	area air defense commander
AAGS	Army air-ground system
AAR	after-action report/review
AAW	antiair warfare
ABCCC	airborne battlefield command and control center
AC	active component
ACA	airspace control authority; airspace coordination area; airlift clearance authority
ACC	air component commander
ACE	air combat element
ACG	air control group
ACM	airspace control measures
ACO	airspace control order
ACP	airspace control plan
ACS	airspace control system
ADA	air defense artillery
ADC	air defense commander
ADW	air defense warning
AEW	airborne early warning
AFARN	Air Force air request net
AFI	Air Force instruction
AFLE	Air Force liaison element
AFFOR	Air Force forces
AI	air interdiction
AIRSUPREQ	air support request
ALCC	airlift control center
ALCE	airlift control element
ALCM	air launched cruise missile
ALOC	air lines of communication
ALLOREQ	air allocation request
ALSP	aggregate level simulations protocol
AMC	Air Mobility Command

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[1] Appendix A was taken from the "Joint Force Air Component Commander Master Training Guide," January 2001

AME	air mobility element
AMW	amphibious warfare
AO	area of operations
AOA	amphibious objective area
AOC	air operations center
AOG	air operations group
AOR	area of responsibility
APOD	aerial port of debarkation
APOE	aerial port of embarkation
ARG	amphibious ready group
ARFOR	Army forces
ASOC	air support operations center
ASUW	antisurface warfare
ASW	antisubmarine warfare
ATACMS	Army Tactical Missile System
ATC	air traffic control
ATO	air tasking order
ATOCONF	air tasking order confirmation
AWACS	Airborne Warning and Control System
AWSIM	Air Warfare Simulation

<u>B</u>

BCD	battlefield coordination detachment
BDA	bomb or battle damage assessment
BMD	ballistic missile defense

<u>C</u>

C2	command and control
C2IPS	command and control information processing system
C2W	command and control warfare
C2WC	command and control warfare commander
C3	command, control, and communications
C3I	command, control, communications, and intelligence
C3IC	coalition, coordination, communications, and integration center
C4	command, control, communications, and computers
C4I	command, control, communications, computers, and intelligence
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
C4S	command, control, communications, and computer systems
CA	combat assessment
CALCM	Conventional Air Launched Cruise Missile

CAOC	combined air operations center; coalition air operations center
CAP	crisis action planning; combat air patrol
CAS	close air support
CATF	commander, amphibious task force
CAX	computer assisted exercise
CB	chemical-biological
CBS	Corps Battle Simulation
CCIR	commander's critical information requirements
C-day	Unnamed day on which a deployment operation begins
CE	communications-electronics; command element; civil engineer(ing)
CEOI	communications-electronics operating instructions
CFACC	Combined Force Air Component Commander; Coalition Force Air Component Commander
CGFOR	Coast Guard forces
CHAP	chaplain
CIA	Central Intelligence Agency
CINC	commander of a combatant command; commander in chief
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual; Chairman of the Joint Chiefs of Memorandum
CJTF	Commander, Joint Task Force
CJTMP	CJCS Joint Training Master Plan
CLF	commander, landing force
CMO	civil-military operations
COA	course of action
COCOM	combatant command (command authority)
COD	combat operations division
COG	center of gravity
COMAFFOR	Commander, Air Force Forces
COMARFOR	Commander, Army Forces
COMMARFOR	Commander, Marine Forces
COMMZ	communication zone
COMNAVFOR	Commander, Naval Forces
COMPT	comptroller
COMPUSEC	computer security
COMSEC	communications security
CONOPS	concept of operations
CONPLAN	operation plan in concept format
CONUS	continental United States
COP	common operational picture
COS	chief of staff
CPD	combat plans division
CPG	contingency planning guidance

CPX	command post exercise
CSAR	combat search and rescue
CSSTSS	Combat Service Support Training Simulation System
CTAPS	Contingency Theater Automated Planning System
CV	aircraft carrier
CVBG	carrier battle group

D

DASC	direct air support center
DCA	defensive counterair
DCJTF	Deputy Commander, Joint Task Force
DCS	Defense Communications System
D-day	Unnamed day on which operations commence or are scheduled to commence
DIA	Defense Intelligence Agency
DIRLAUTH	direct liaison authorized
DIRMOBFOR	Director of Mobilization Forces
DOD	Department of Defense
DODD	Department of Defense Directive
DOS	Department of State
DOT	Department of Transportation

E

E&E	evasion and escape
EA	electronic attack
EC	electronic combat
EEFI	essential elements of friendly information
EEI	essential elements of information
ENDEX	exercise termination
ENWGS	Enhanced Naval Warfare Gaming System
EO	electro-optical
EOB	enemy order of battle
EP	electronic protection; execution planning
ES	electronic warfare support
EW	electronic warfare
EXORD	exercise order
EXPLAN	exercise plan

F

FER	final exercise report
F-hour	Effective time of announcement by the Secretary of Defense to the Military Departments of a decision to mobilize Reserve units
FLOT	forward line of own troops
FM	field manual
FMFM	Fleet Marine Force Manual
FSCL	fire support coordination line
FTX	field training exercise

G

GAT	guidance, apportionment, and targeting cell
GCE	ground combat element
GCC	ground component commander
GCCS	Global Command and Control System
GDSS	Global Decision Support System
GPS	Global Positioning System

H

H-hour	Specific time an operation or exercise begins; seaborne assault landing hour
HN	host nation
HNS	host nation support
HPT	high priority target(s)
HQ	headquarters
HVT	high value target(s)

I

I&W	indications and warning
IAW	in accordance with
ICO	interface control officer
IEW	intelligence and electronic warfare
IFF	identification, friend or foe
INFLTREP	in-flight Report
INFOSEC	information security
INTREP	intelligence report
INTSUM	intelligence summary
IO	information operations
IR	information requirements
ITEM	Integrated Tactical Engagement Model

IW   information warfare

<center>J</center>

J-1	Manpower and Personnel Directorate of a joint staff
J-2	Intelligence Directorate of a joint staff
J-3	Operations Directorate of a joint staff
J-4	Logistics Directorate of a joint staff
J-5	Plans Directorate of a joint staff
J-6	Command, Control, Communications, and Computer Systems Directorate of a joint staff
JAC	Joint Analysis Center
JAG	Judge Advocate General
JAO	joint area of operations
JAOC	joint air operations center
JAOP	joint air operations plan
JC2WC	Joint Command and Control Warfare Center
JCM	Joint Conflict Model
JCMOTF	joint civil-military operations task force
JCS	Joint Chiefs of Staff
JCSAR	joint combat search and rescue
JECEWSI	Joint Electronic Combat Electronic Warfare Simulation
JECG	joint exercise control group
JFACC	joint force air component commander
JFC	joint force commander
JFLCC	joint force land component commander
JFMCC	joint force maritime component commander
J-SEAD	joint suppression of enemy air defenses
JFSOCC	joint force special operations component commander
JIC	Joint Intelligence Center
JIPTL	joint integrated prioritized target list
JMET	joint mission essential task
JMETL	joint mission essential task list
JMO	joint maritime operations; joint meteorological officer
JOA	joint operations area
JOPES	Joint Operation Planning and Execution System
JP	joint pub
JPOTF	joint psychological operations task force
JRC	joint reconnaissance center
JS	Joint Staff
JSAR	joint search and rescue
JSOACC	joint special operations air component commander
JSOTF	joint special operations task force
JSRC	joint search and rescue center
JSST	Joint Space Support Team
JSTARS	Joint Surveillance, Target Attack Radar System

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JTC	joint targeting cell
JTCB	Joint Targeting Coordination Board
JTF	joint task force
JTIDS	Joint Tactical Information Distribution System
JTL	joint target list
JTLS	Joint Theater Level Simulation
JTTP	joint tactics, techniques, and procedures
JULLS	Joint Universal Lessons Learned System

<u>L</u>

LCC	land component commander
L-hour	Specific hour on C-day at which a deployment operation commences or is to commence
LNO	liaison officer
LOAC	law of armed conflict
LOC	lines of communications

<u>M</u>

MAAP	Master Air Attack Plan
MACCS	Marine Air Command and Control System
MAG	Marine aircraft group
MAGTF	Marine air-ground task force
MARFOR	Marine Corps forces
MARLO	Marine liaison officer
MC&G	mapping, charting, and geodesy
M-day	Mobilization Day; unnamed day on which mobilization of forces begins
METOC	meteorological and oceanographic
METT-T	mission, enemy, terrain, troops and time available
MEU	Marine expeditionary unit
MIO	maritime intercept operations
MLRS	Multiple Launch Rocket System
MOE	measure of effectiveness
MOOTW	military operations other than war
MOP	memorandum of policy
MPS	maritime prepositioning ships
MSEL	master scenario events list
MTG	master training guide
MTT	mobile training team
MTWS	Marine Tactical Warfare System

<u>N</u>

NAF	numbered air force

NALE	naval and amphibious liaison element
NAVFOR	Navy forces
NBC	nuclear, biological, and chemical
NCA	National Command Authorities
NCC	naval component commander
N-day	Day an active duty unit is notified for deployment or redeployment
NEO	noncombatant evacuation operation
NRO	National Reconnaissance Office
NSA	National Security Agency
NSC	National Security Council
NTACS	Navy Tactical Air Control System
NWP	naval warfare publication

O

OB	order of battle
OCA	offensive counterair
OCONUS	outside the continental United States
OOTW	operations other than war
OP	operational (level task)
OPCON	operational control
OPLAN	operation plan
OPORD	operation order
OPREP	operational report
OPS	operations
OPSEC	operations security
OSD	Office of the Secretary of Defense
OT, O/T	observer/trainer

P

PHIBGRU	amphibious group
PHIBRON	amphibious squadron
PIR	priority intelligence requirements
PIREP	pilot report
POD	port of debarkation
POE	port of embarkation
POLAD	political advisor
PSYOP	psychological operations

R

RC	reserve component
RCC	rescue coordination center

RECCE/RECON	reconnaissance
RESA	Research, Evaluation, and Systems Analysis (simulation model)
RFI	request for information
ROE	rules of engagement
ROZ	restricted operations zone
RPV	remotely piloted vehicle
RSTA	reconnaissance, surveillance, and target acquisition

S

SAR	search and rescue; special access required
SCI	sensitive compartmented information
SCIF	sensitive compartmentalized information facility
SCL	standard conventional load
SEAD	suppression of enemy air defenses
SECDEF	Secretary of Defense
SERE	survival, evasion, resistance, escape
SI	special intelligence
SIF	selective identification feature
SITREP	situation report
SJA	Staff Judge Advocate
SLOC	sea line of communication
SME	subject matter expert
SOF	special operations forces
SOFA	status of forces agreement
SOLE	special operations liaison element
SOP	standard operating procedures
SORTIEALOT	sortie allotment
SPECAT	special category
SPINS	special instructions
SSO	special security office(r)
SST	space support team
STO	special technical operations
STRAT	strategic attack
STRATLAT	strategic liaison team
STW	strike warfare
SURG	surgeon
SVC	Service(s)
SWO	staff weather officer

T

TACC	tactical air command center (USMC); tactical air control center (USN); tanker/airlift control center (USAF)
TACON	tactical control

TACP	tactical air control party
TACS	Theater Air Control System; tactical air control system;
TACS/AAGS	Theater Air Control System/Army air-ground system
TACSIM	Tactical Simulation
TACWAR	Tactical Warfare
TADC	tactical air direction center
TADS	Tactical Air Defense System
TAGS	Theater Air-Ground System
TAOC	tactical air operations center (USMC)
TBM	theater ballistic missile
TBMD	theater ballistic missile defense
TF	task force
TLAM	Tomahawk land-attack missile
TMD	theater missile defense
TPFDD	time-phased force and deployment data
TPFDL	time-phased force and deployment list
TTP	tactics, techniques, and procedures
TW/AA	tactical warning and attack assessment

<div align="center"><u>U</u></div>

UAV	unmanned aerial vehicle
UCCATS	Urban Combat Computer Assisted Training System
UJT	universal joint task
UJTL	Universal Joint Task List
USA	United States of America; United States Army
USAF	United States Air Force
USCENTCOM	United States Central Command
USCG	United States Coast Guard
USEUCOM	United States European Command
USFJ	United States Forces Japan
USFK	United States Forces Korea
USFORAZORES	United States Forces Azores
USJFCOM	United States Joint Forces Command
USG	United States Government
USMC	United States Marine Corps
USN	United States Navy
USPACOM	United States Pacific Command
USSOCOM	United States Special Operations Command
USSOUTHCOM	United States Southern Command
USSPACECOM	United States Space Command
USSTRATCOM	United States Strategic Command
USTRANSCOM	United States Transportation Command

WX	weather
YR	year
Z	zulu
ZULU	time zone indicator for universal time

PART - 2 DEFINITIONS

A

airborne early warning and control—Air surveillance and control provided by airborne early warning aircraft which are equipped with search and height-finding radar and communications equipment for controlling weapon systems. (Joint Pub 1-02)

air defense—All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. (Joint Pub 1-02)

air interdiction—Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (Joint Pub 1-02)

air offensive—Sustained operations by strategic and/or tactical air weapon systems against hostile air forces or surface targets. (Joint Pub 1-02)

air operations center—The principal air operations installation from which aircraft and air warning functions of combat air operations are directed, controlled, and executed. It is the senior agency of the Air Force Component Commander from which command and control of air operations are coordinated with other components and Services. Also called **AOC.** (Joint Pub 1-02)

air reconnaissance—The acquisition of intelligence information by employing visual observation and/or sensors in air vehicles. (Joint Pub 1-02)

airspace control authority—The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (Joint Pub 1-02)

airspace control order—An order implementing the airspace control plan that provides the details of the approved requests for airspace control measures. It is published either as part of the air tasking order or as a separate document. Also called **ACO.** (Joint Pub 1-02)

airspace control plan—The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force area of responsibility/joint operations area. Also called **ACP.** (Joint Pub 1-02)

air superiority—That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing

force. (Joint Pub 1-02)

air support—All forms of support given by air forces on land or sea. (Joint Pub 1-02)

air supremacy—That degree of air superiority wherein the opposing air force is incapable of effective interference. (Joint Pub 1-02)

air surveillance—The systematic observation of air space by electronic, visual or other means, primarily for the purpose of identifying and determining the movements of aircraft and missiles, friendly and enemy, in the air space under observation. (Joint Pub 1-02)

air tasking order—A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties/capabilities/forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called **ATO.** (Joint Pub 1-02)

alliance—An alliance is the result of formal agreements (i.e., treaties) between two or more nations for broad, long-term objectives which further the common interests of the members. (Joint Pub 1-02)

allocation (air)—The translation of the air apportionment decision into total numbers of sorties by aircraft type available for each operation or task. (Joint Pub 1-02)

allotment—The temporary change of assignment of tactical air forces between subordinate commands. The authority to allot is vested in the commander having combatant command (command authority). (Joint Pub 1-02)

apportionment (air)—The determination and assignment of the total expected air effort by percentage and/or by priority that should be devoted to the various air operations and/or geographic areas for a given period of time. Also called **air apportionment.** (Joint Pub 1-02)

area air defense commander—Within a unified command, subordinate unified command, or joint task force, the commander will assign overall responsibility for air defense to a single commander. Normally, this will be the component commander with the preponderance of air defense capability and the command control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the area air defense commander's headquarters. Also called **AADC.** (Joint Pub 1-02)

area of operations—An operational area defined by the joint force commander for land and naval forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. Also called **AO.** (Joint Pub 1-02)

area of responsibility—1. The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations. 2. In naval usage, a predefined area of enemy terrain for which supporting ships are responsible for covering by fire on known targets or targets of opportunity and by observation. Also called **AOR.** (Joint Pub 1-02)

battle damage assessment—The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. Battle damage assessment can be applied to the employment of all types of weapon systems (air, ground, naval, and special forces weapon systems) throughout the range of military operations. Battle damage assessment is primarily an intelligence responsibility with required inputs and coordination from the operators. Battle damage assessment is composed of physical damage assessment, functional damage assessment, and target system assessment. Also called **BDA.** (Joint Pub 1-02)

battlefield coordination detachment—An Army liaison provided by the Army component commander to the Air Operations Center (AOC) and/or to the component designated by the joint force commander to plan, coordinate, and deconflict air operations. The battlefield coordination detachment processes Army requests for tactical air support, monitors and interprets the land battle situation for the AOC, and provides the necessary interface for exchange of current intelligence and operational data. Also called **BCD.** (Joint Pub 1-02)

bomb damage assessment—The determination of the effect of all air attacks on targets (e.g.,
bombs, rockets, or strafing). Also called BDA. (Joint Pub 1-02)

campaign—A series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space. (Joint Pub 1-02)

campaign plan—A plan for a series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space. (Joint Pub 1-02)

centers of gravity—Those characteristics, capabilities, or localities from which a military force derives its freedom of action, physical strength, or will to fight. (Joint Pub 1-02)

close air support—Air action by fixed- and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Also called **CAS.** (Joint Pub 1-02)

close support—That action of the supporting force against targets or objectives which are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force. (Joint Pub 1-02)

coalition—An ad hoc arrangement between two or more nations for common action. (Joint Pub 1-02)

coalition force—A force composed of military elements of nations that have formed a temporary alliance for some specific purpose. (Joint Pub 1-02)

combat air patrol—An aircraft patrol provided over an objective area, over the force protected, over the critical area of a combat zone, or over an air defense area, for the purpose of intercepting and destroying hostile aircraft before they reach their target. Also called **CAP.** (Joint Pub 1-02)

combat assessment—The determination of the overall effectiveness of force employment during military operations. Combat assessment is composed of three major components, (a) battle damage assessment, (b) munitions effects assessment, and (c) reattack recommendation. The objective of combat assessment is to identify recommendations for the course of military operations. The J-3 is normally the single point of contact for combat assessment at the joint force level, assisted by the joint force J-2. Also called **CA.** (Joint Pub 1-02)

combatant command—A unified or specified command with a broad continuing mission under a single commander established and so designated by the President, through the Secretary of Defense and with the advice and assistance of the Chairman of the Joint Chiefs of Staff. Combatant commands typically have geographic or functional responsibilities. (Joint Pub 1-02)

combatant command (command authority)—A unified or specified command with a broad continuing mission under a single commander established and so designated by the President, through the Secretary of Defense and with the advice and assistance of the Chairman of the Joint Chiefs of Staff. Combatant commands typically have geographic or functional responsibilities. Nontransferable command authority established by title 10 (" Armed Forces"), United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called **COCOM.** (Joint Pub 1-02)

combatant commander—A commander in chief of one of the unified or specified combatant commands established by the President. (Joint Pub 1-02)

combat search and rescue—A specific task performed by rescue forces to effect the recovery of distressed personnel during war or military operations other than war. Also called **CSAR.** (Joint Pub 1-02)

combined force—A military force composed of elements of two or more allied nations. (Joint Pub 1-02)

combined operation—An operation conducted by forces of two or more allied nations acting together for the accomplishment of a single mission. (Joint Pub 1-02)

combined staff—A staff composed of personnel of two or more allied nations. (Joint Pub 1-02)

command and control—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement

of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called **C2.** (Joint Pub 1-02)

command and control system—The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned. (Joint Pub 1-02)

command and control warfare—The integrated use of operations security, military deception, psychological operations, electronic warfare, and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary command and control capabilities, while protecting friendly command and control capabilities against such actions. Command and control warfare is an application of information operations in military operations and is a subset of information warfare. Command and control warfare applies across the range of military operations and all levels of conflict. Also called **C2W.** C2W is both offensive and defensive: a. **C2-attack.** Prevent effective C2 of adversary forces by denying information to, influencing, degrading, or destroying the adversary C2 system. B. **C2-protect.** Maintain effective command and control of own forces by turning to friendly advantage or negating adversary efforts to deny information to, influence, degrade, or destroy the friendly C2 system. (Joint Pub 1-02)

command post exercise—An exercise in which the forces are simulated, involving the commander, his staff, and communications within and between headquarters. (Joint Pub 1-02)

component—1. One of the subordinate organizations that constitute a joint force. Normally a joint force is organized with a combination of Service and functional components. 2. In logistics, a part or combination of parts having a specific function, which can be installed or replaced only as an entity. (Joint Pub 1-02)

counter air—A US Air Force term for air operations conducted to attain and maintain a desired degree of air superiority by the destruction or neutralization of enemy forces. Both air offensive and air defensive actions are involved. The former range throughout enemy territory and are generally conducted at the initiative of the friendly forces. The latter are conducted near or over friendly territory and are generally reactive to the initiative of the enemy air forces. (Joint Pub 1-02)

course of action—1. A plan that would accomplish, or is related to, the accomplishment of a mission. 2. The scheme adopted to accomplish a task or mission. It is a product of the Joint Operation Planning and Execution System concept development phase. The supported commander will include a recommended course of action in the commander's estimate. The recommended course of action will include the concept of operations, evaluation of supportability estimates of supporting organizations, and an integrated time-phased data base of combat, combat support, and combat service support forces and sustainment. Refinement of this data base will be contingent on the time available for course of action development. When approved, the course of action becomes the basis for the development of an operation plan or operation order. Also called **COA.** (Joint Pub 1-02)

defensive information operations—The integration and coordination of policies and procedures,
operations, personnel, and technology to protect and defend information and information systems. Defensive information operations are conducted through information assurance, physical security, operations security, counter-deception, counter-psychological operations, counterintelligence, electronic warfare, and special information operations. Defensive information operations ensure timely, accurate, and relevant information access while denying adversaries the opportunity to exploit friendly information and information systems for their own purposes. (Joint Pub 1-02)

director of mobility forces—Normally a senior officer who is familiar with the area of responsibility or joint operations area and possesses an extensive background in airlift operations. When established, the director of mobility forces serves as the designated agent for all airlift issues in the area of responsibility or joint operations area, and for other duties as directed. The director of mobility forces exercises coordinating authority between the airlift coordination cell, the air mobility element, the Tanker Airlift Control Center, the movement center, and the air operations center in order to expedite the resolution of airlift problems. The director of mobility forces may be sourced from the theater's organizations, United States Transportation Command, or United States Atlantic Command. Also called **DIRMOBFOR.** (Joint Pub 1-02)

doctrine—Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application. (Joint Pub 1-02)

<center>E</center>

electronic warfare—Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. Also called **EW.** The three major subdivisions within electronic warfare are: electronic attack, electronic protection, and electronic warfare support. a. electronic attack. That division of electronic warfare involving the use of electromagnetic, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability. Also called **EA.** EA includes: 1) actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception, and 2) employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (lasers, radio frequency weapons, particle beams). b. electronic protection. That division of electronic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability. Also called **EP.** c. electronic warfare support. That division of electronic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support provides information required for immediate decisions involving electronic warfare operations and other tactical actions

such as threat avoidance, targeting, and homing. Also called **ES.** Electronic warfare support data can be used to produce signals intelligence, both communications intelligence, and electronics intelligence. (Joint Pub 1-02)

executive agent—A term used in Department of Defense and Service regulations to indicate a delegation of authority by a superior to a subordinate to act on behalf of the superior. An agreement between equals does not create an executive agent. For example, a Service cannot become a Department of Defense Executive Agent for a particular matter with simply the agreement of the other Services; such authority must be delegated by the Secretary of Defense. Designation as executive agent, in and of itself, confers no authority. The exact nature and scope of the authority delegated must be stated in the document designating the executive agent. An executive agent may be limited to providing only administration and support or coordinating common functions, or it may be delegated authority, direction, and control over specified resources for specified purposes. (Joint Pub 1-02)

<div align="center">F</div>

field exercise—An exercise conducted in the field under simulated war conditions in which troops and armament of one side are actually present, while those of the other side may be imaginary or in outline. (Joint Pub 1-02)

fire support coordination line—A fire support coordination measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines (FSCLs) facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSCL applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse affects on, or to the rear of, the line. Short of an FSCL, all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCL should follow well defined terrain features. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources. Also called **FSCL.** (Joint Pub 1-02)

functional component command—A command normally, but not necessarily, composed of forces of two or more Military Departments which may be established across the range of military operations to perform particular operational missions that may be of short duration or may extend over a period of time. (Joint Pub 1-02)

<div align="center">G</div>

Global Command and Control System—Highly mobile, deployable command and control system supporting forces for joint and multinational operations across the

range of military operations, any time and anywhere in the world with compatible, interoperable, and integrated command, control, communications, computers, and intelligence systems. Also called **GCCS.** (Joint Pub 1-02)

guidance—1. Policy, direction, decision, or instruction having the effect of an order when promulgated by a higher echelon. 2. The entire process by which target intelligence information received by the guided missile is used to effect proper flight control to cause timely direction changes for effective target interception. (Joint Pub 1-02)

I

indirect air support—All forms of air support provided to land or naval forces which do not immediately assist those forces in the tactical battle. (Joint Pub 1-02)

information operations—Actions taken to affect adversary information and information systems while defending one's own information and information systems. Also called **IO.** (Joint Pub 1-02)

information superiority—The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same. (Joint Pub 1-02)

intertheater—Between theaters or between the continental United States and theaters. (Joint Pub 1-02)

intratheater—Within a theater. (Joint Pub 1-02)

J

joint air operations—Air operations performed with air capabilities/forces made available by components in support of the joint force commander's operation or campaign objectives, or in support of other components of the joint force. (Joint Pub 1-02)

joint air operations center—A jointly staffed facility established for planning, directing, and executing joint air operations in support of the joint force commander's operation or campaign objectives. Also called **JAOC.** (Joint Pub 1-02)

joint air operations plan—A plan for a connected series of joint air operations to achieve the joint force commander's objectives within a given time and theater of operations. (Joint Pub 1-02)

joint combat search and rescue operation—A combat search and rescue operation in support of a component's military operations that has exceeded the combat search and rescue capabilities of that component and requires the efforts of two or more components of the joint force. Normally, the operation is conducted by the joint force commander or a component commander that has been designated by joint force commander tasking. (Joint Pub 1-02)

joint doctrine—Fundamental principles that guide the employment of forces of two or more Services in coordinated action toward a common objective. It will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff. (Joint Pub 1-02)

joint force—A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments, operating under a single

joint force commander. (Joint Pub 1-02)

joint force air component commander—The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The joint force commander will normally designate a joint force air component commander. The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's apportionment decision). Using the joint force commander's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. Also called **JFACC.** (Joint Pub 1-02)

joint force commander—A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. Also called **JFC.** (Joint Pub 1-02)

joint integrated prioritized target list—A prioritized list of targets and associated data approved by a joint force commander, and maintained by a joint task force. Targets and priorities are derived from the recommendations of components in conjunction with their proposed operations supporting the joint force commander's objectives and guidance. Also called **JIPTL.** (Joint Pub 1-02)

joint operations area—An area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which a joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission. Joint operations areas are particularly useful when operations are limited in scope and geographic area or when operations are to be conducted on the boundaries between theaters. Also called **JOA.** (Joint Pub 1-02)

joint publication—Publication of joint interest prepared under the cognizance of Joint Staff directorates and applicable to the Military Departments, combatant commands, and other authorized agencies. It is approved by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff. Also called **JP.** (Joint Pub 1-02)

joint search and rescue center—A primary search and rescue facility suitably staffed by supervisory personnel and equipped for planning, coordinating, and executing joint search and rescue and combat search and rescue operations within the geographical area assigned to the joint force. The facility is operated jointly by personnel from two or more Service or functional components or it may have a multinational staff of personnel from two or more allied or coalition nations (multinational search and rescue center). The joint search and rescue center should be staffed equitably by trained personnel drawn from each joint force component, including US Coast Guard participation where practical. Also called **JSRC.** (Joint Pub 1-02)

joint special operations air component commander—The commander within the

joint force special operations command responsible for planning and executing joint special air operations and for coordinating and deconflicting such operations with conventional nonspecial operations air activities. The joint special operations air component commander normally will be the commander with the preponderance of assets and/or greatest ability to plan, coordinate, allocate, task, control, and support the assigned joint special operations aviation assets. The joint special operations air component commander may be directly subordinate to the joint force special operations component commander or to any nonspecial operations component or joint force commander as directed. Also called **JSOACC.** (Joint Pub 1-02)

Joint Staff doctrine sponsor—The sponsor for a joint doctrine or joint tactics, techniques, and procedures (JTTP) project. Each joint doctrine or JTTP project will be assigned a Joint Staff doctrine sponsor. The Joint Staff doctrine sponsor will assist the lead agent and primary review authority as requested and directed. The Joint Staff doctrine sponsor will coordinate the draft document with the Joint Staff and provide Joint Staff comments and recommendations to the primary review authority. (Joint Pub 1-02)

joint suppression of enemy air defenses—A broad term that includes all suppression of enemy air defense activities provided by one component of the joint force in support of another. Also called **J-SEAD.** (Joint Pub 1-02)

joint tactics, techniques, and procedures—The actions and methods which implement joint doctrine and describe how forces will be employed in joint operations. They will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff. Also called **JTTP.** (Joint Pub 1-02)

joint targeting coordination board—A group formed by the joint force commander to accomplish broad targeting oversight functions that may include but are not limited to coordinating targeting information, providing targeting guidance and priorities, and preparing and/or refining joint target lists. The board is normally comprised of representatives from the joint force staff, all components, and if required, component subordinate units. Also called **JTCB.** (Joint Pub 1-02)

joint target list—A consolidated list of selected targets considered to have military significance in the joint operations area. (Joint Pub 1-02)

joint task force—A joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a subunified commander, or an existing joint task force commander. Also called **JTF.** (Joint Pub 1-02)

L

lead agent—Individual Services, combatant commands, or Joint Staff directorates may be assigned as lead agents for developing and maintaining joint doctrine, joint tactics, techniques, and procedures (JTTP) publications, or joint administrative publications. The lead agent is responsible for developing, coordinating, reviewing, and maintaining an assigned doctrine, JTTP, or joint administrative publication. (Joint Pub 1-02)

master air attack plan—A plan that contains key information that forms the foundation of the joint air tasking order. Sometimes referred to as the air employment plan or joint air tasking order shell. Information which may be included: joint force commander guidance, joint force air component commander guidance, support plans, component requests, target update requests, availability of capabilities/forces, target information from target lists, aircraft allocation, etc. Also called **MAAP.** (Joint Pub 1-02)

military operations other than war—Operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any combination of the other instruments of national power and occur before, during, and after war. Also called **MOOTW.** (Joint Pub 1-02)

mission—1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. 2. In common usage, especially when applied to lower military, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task. (Joint Pub 1-02)

National Command Authorities—The President and the Secretary of Defense or their duly deputized alternates or successors. Also called **NCA.** (Joint Pub 1-02)

offensive counter air operation—An operation mounted to destroy, disrupt, or limit enemy air power as close to its source as possible. (Joint Pub 1-02)

offensive information operations—The integrated use of assigned and supporting capabilities and activities, mutually supported by intelligence, to affect adversary decisionmakers to achieve or promote specific objectives. These capabilities and activities include, but are not limited to, operations security, military deception, psychological operations, electronic warfare, physical attack and/or destruction, and special information operations, and could include computer network attack. (Joint Pub 1-02)

operational art—The employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art translates the joint force commander's strategy into operational design, and, ultimately, tactical action, by integrating the key activities at all levels of war. (Joint Pub 1-02)

operational control—Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the

commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called **OPCON.** (Joint Pub 1-02)

operational level of war—The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives. (Joint Pub 1-02)

order of battle—The identification, strength, command structure, and disposition of the personnel, units, and equipment of any military force. (Joint Pub 1-02)

P

psychological operations—Planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals. The purpose of psychological operations is to induce or reinforce foreign attitudes and behavior favorable to the originator's objectives. Also called **PSYOP.** (Joint Pub 1-02)

R

rescue coordination center—A primary search and rescue facility suitably staffed by supervisory personnel and equipped for coordinating and controlling search and rescue and/or combat search and rescue operations. The facility is operated unilaterally by personnel of a single Service or component. For Navy component operations, this facility may be called a rescue coordination team. Also called **RCC (or RCT for Navy component).** (Joint Pub 1-02)

rules of engagement—Directives issued by competent military authority which delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered. Also called **ROE.** (Joint Pub 1-02)

S

search and rescue—The use of aircraft, surface craft, submarines, specialized rescue teams, and equipment to search for and rescue personnel in distress on land or at sea. (DOD) Also called **SAR.** (Joint Pub 1-02)

Service component command—A command consisting of the Service component commander and all those Service forces, such as individuals, units, detachments,

organizations, and installations under the command, including the support forces that have been assigned to a combatant command, or further assigned to a subordinate unified command or joint task force. (Joint Pub 1-02)

special staff—All staff officers having duties at a headquarters and not included in the general (coordinating) staff group or in the personal staff group. The special staff includes certain technical specialists and heads of services, e.g., quartermaster officer, antiaircraft officer, transportation officer, etc. (Joint Pub 1-02)

strategic airlift—The common-user airlift linking theaters to the continental United States (CONUS) and to other theaters as well as the airlift within CONUS. These airlift assets are assigned to the Commander in Chief, Unites States Transportation Command. Due to the intertheater ranges usually involved, strategic airlift is normally comprised of the heavy, longer range, intercontinental airlift assets but may be augmented with shorter range aircraft when required. Also called **intertheater airlift.** (Joint Pub 1-02)

strategic level of war—The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish these objectives. Activities at this level establish national and multinational military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide military forces and other capabilities in accordance with strategic plans. (Joint Pub 1-02)

supported commander—The commander having primary responsibility for all aspects of a task assigned by the Joint Strategic Capabilities Plan or other joint operation planning authority. In the context of joint operation planning, this term refers to the commander who prepares operation plans or operation orders in response to requirements of the Chairman of the Joint Chiefs of Staff. (Joint Pub 1-02)

supporting commander—A commander who provides augmentation forces or other support to a supported commander or who develops a supporting plan. Includes the designated combatant commands and Defense agencies as appropriate. (Joint Pub 1-02)

suppression of enemy air defenses—That activity which neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. Also called **SEAD.** (Joint Pub 1-02)

T

tactical air command center—The principal US Marine Corps air command and control agency from which air operations and air defense warning functions are directed. It is the senior agency of the US Marine air command and control system which serves as the operational command post of the aviation combat element commander. It provides the facility from which the aviation combat element commander and his battle staff plan, supervise, coordinate, and execute all current and future air operations in support of the Marine air-ground task force. The tactical air command center can provide integration, coordination, and direction of joint and combined air operations. Also called Marine **TACC.** (Joint Pub 1-02)

tactical air control center—The principal air operations installation (ship-based)

from which all aircraft and air warning functions of tactical air operations are controlled. Also called Navy **TACC.** (Joint Pub 1-02)

tactical air control system—The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions. (Joint Pub 1-02)

tactical air operation—An air operation involving the employment of air power in coordination with ground or naval forces to: a. gain and maintain air superiority; b. prevent movement of enemy forces into and within the objective area and to seek out and destroy these forces and their supporting installations; c. join with ground or naval forces in operations within the objective area, in order to assist directly in attainment of their immediate objective. (Joint Pub 1-02)

tactical control—Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called **TACON.** (Joint Pub 1-02)

Tanker Airlift Control Center—The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command's global air mobility mission. The Tanker Airlift Control Center is comprised of the following functions: current operations, command and control, logistics operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, weather, and intelligence. Also called **TACC.** (Joint Pub 1-02)

targeting—1. The process of selecting targets and matching the appropriate response to them, taking account of operational requirements and capabilities. 2. The analysis of enemy situations relative to the commander's mission, objectives, and capabilities at the commander's disposal, to identify and nominate specific vulnerabilities that, if exploited, will accomplish the commander's purpose through delaying, disrupting, disabling, or destroying enemy forces or resources critical to the enemy. (Joint Pub 1-02)

target list—The listing of targets maintained and promulgated by the senior echelon of command; it contains those targets that are to be engaged by supporting arms, as distinguished from a "list of targets" that may be maintained by any echelon as confirmed, suspected, or possible targets for informational and planning purposes. (Joint Pub 1-02)

task force—1. A temporary grouping of units, under one commander, formed for the purpose of carrying out a specific operation or mission. 2. Semi-permanent organization of units, under one commander, formed for the purpose of carrying out a continuing specific task. 3. A component of a fleet organized by the commander of a task fleet or higher authority for the accomplishment of a specific task or tasks. (Joint Pub 1-02)

theater airlift—That airlift assigned or attached to a combatant commander other than Commander in Chief, US Transportation Command, which provides air

movement and delivery of personnel and equipment directly into objective areas through air landing, airdrop, extraction, or other delivery techniques; and the air logistic support of all theater forces, including those engaged in combat operations, to meet specific theater objectives and requirements. Also called **intratheater airlift.** (Joint Pub 1-02)

theater of operations—A subarea within a theater of war defined by the geographic combatant commander required to conduct or support specific combat operations. Different theaters of operations within the same theater of war will normally be geographically separate and focused on different enemy forces. Theaters of operations are usually of significant size, allowing for operations over extended periods of time. (Joint Pub 1-02)

time-sensitive targets—Those targets requiring immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative, fleeting targets of opportunity. (Joint Pub 1-02)

U

unmanned aerial vehicle—A powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload. Ballistic or semi-ballistic vehicles, cruise missiles, and artillery projectiles are not considered unmanned aerial vehicles. Also called **UAV.** (Joint Pub 1-02)

W

war game—A simulation, by whatever means, of a military operation involving two or more opposing forces, using rules, data, and procedures designed to depict an actual or assumed real life situation. (Joint Pub 1-02)

weapons of mass destruction—In arms control usage, weapons that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people. Can be nuclear, chemical, biological, and radiological weapons, but excludes the means of transporting or propelling the weapon where such means is a separable and divisible part of the weapon. Also called **WMD.** (Joint Pub 1-02)

Appendix B

AOC Technology
Baseline AOC Systems and Equipment

The purpose of this attachment is to standardize the systems within Air Force Aerospace Operations Centers (AOC). The AOC System Baseline Oversight Board (BOB) has approved this list. The equipment list associated with these systems is for general information only. [1]

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Air Defense Systems Integrator (ADSI) AN/TSQ-214		Communications processor used to receive and process TADIL-A/B/J, TIBS, and TRAP.		ATO Execution

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[1] Air Force Instruction (AFI) 13-1 AOC, Volume 3, *Operational Procedures—Aerospace Operations Center,* 2001 (in draft), 118-127. This information is taken verbatim from this instruction. Minor modifications were made in order to comply with formatting requirements.

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
ADVERSARY		Adversary is a communications modeling tool used to analyze the communications infrastructure of target countries and then report the results of the analysis in graphical format.	SCI	Strategy development Detailed planning Assessment & analysis
Command and Control Information Processing System (C2IPS)		Plans theater airlift missions. Monitors all air mobility arrivals, departures, diverts, and overflights in theater.	AMC System; Air Mobility Division provides.	Detailed Planning ATO Production ATO Execution
	EOI	Interface between CTAPS/ C2IPS databases and applications.		Detailed Planning ATO Production ATO Execution
Communications and Networks	TSC-129 or Hammer Rick	UHF radio-SATCOM or LOS point to point	Rapidly deployable, single channel, secure voice, fax, and data transfer	C2
	TSC-100A	High capacity SATCOM (Hub)	Tactical, military band only, transmission system	All
	URC-119 or Pacer Bounce	HF Radio	Single channel voice, can be secured, long distance, air-to-ground	C2
	TSC-85/94	Medium capacity SATCOM (Spoke)	Tactical, military band only, transmission system	All

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
	IDNX	Multiplexer	Combines many channels into one, transmission system,	All
	FCC-100	Multiplexer	Combines many channels into one, transmission system,	All
	Red Comm	Telephone Switch	DSN, fax, commercial, secure/non-secure phone	All
	TTC-39A(v)4	Telephone Switch	DSN, fax, commercial, secure/non-secure phone	All
	Various COTS	Hubs/Routers/ Switches	Computer to data network connectivity	All
	Cisco (COTS)	Data Router	Data network to data network connectivity	All
	INMARSAT B	International Maritime Satellite System	Secure / non-secure commercial telephone, weather data.	ATO
	NIPRNET	Nonsecure Internet Protocol Router Network	Unclassified TCP/IP network	All
	MEP-803, MEP-805, etc	HVAC / power Production	Tactical Environmental and power support	Comm
	LMST	High capacity STACOM Hub	Tactical, military or commercial band, transmission system.	All
	SIPRNET	Secure Internet Protocol Router Network	Secret collateral TCP/IP network	All

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
	JWICS	Joint World-wide Intelligence Communications System	TS/SCI TCP/IP network	All
	TDPS	Tactical Data Processing Suite	Replaces TEP Van. Receives/processes/displays/ analyzes Tactical and national ELINT. Receives DARPASAT-related data	All
	TRS	Tactical Receive Suite	Replaces TRE. Receives TADIL-A/B/J, TIBS, and TRAP.	ATO
Contingency Theater Automated Planning System (CTAPS)				Detailed Planning, ATO Production, ATO Execution, Assessment and Analysis
	ADS	Airspace Deconfliction System	Inputs: Manual Updates Output: ACO	ATO Production, ATO Execution
	APPLIX	CTAPS Office Applications		All
	APS	Advanced Planning System	Inputs: TNL, ACO, order of battle, weaponeering options. Output: ATO, planning database	Detailed Planning, ATO Production

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
	CAFMS-X	Computer-Assisted Force Management System. Provides Gantt chart display of ATO to monitor execution	Input: ATO planning database. Output: Mission status, Target List, Base Status	ATO Execution
Deployable Transit System (DTS) Imagery Support Elements (ISE)	Replaced JSIPS-A. Only sub-element of DCGS likely to be collocated with the AOC.	Provides the AOC DCGS elements with imagery exploitation capabilities. Added capabilities for Multi-INT and ISR Battle Management being fielded		
Distributed Common Ground System (DCGS)		Air Force architecture for PED. Provides means of exploiting national Commercial and Airborne Imagery and SIGNET.	Made up of CONUS Core Sites (DGS 1-2), Regional Core sites (DGC 3-4) and remote sites (imagery, SIGINT and AOC). Can be structured to meet JTF and JFACC PEDs process requirements.	Strategy Development, Detailed Planning, Assessment and Analysis.
Enhanced Small Tactical Terminal (E-STT) AN/TMQ 43		Small, lightweight, rapidly deployable, computer-based satellite imagery reception and analysis systems.	Air Force personnel use the STT to enhance weather support to a broad range of Air Force, Army, joint, and combined combat and peacetime operations.	All

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Electronic Staff Weather Officer Kit (ESK)		PC based software to reach back to other weather sites. Provides reception of weather satellite data and imagery for tactical weather forecasting in deployed locations.	Receives information feed via GBS.	All
Generic Area Limitation Environment (GALE)		GALE is a software program that provides a GIS functionality that supports area limitation and movement modeling.	Assists the analyst in determining locations that vehicles cannot access due to terrain limitations. (Decreases the search area).	ATO Execution Detailed planning Strategy development Assessment and analysis
Global Broadcast Service (GBS)		The GBS system provides near worldwide coverage, using a one-way (broadcast), high data rate communications link. The information in the broadcast flows from rear-echelon locations to deployed military forces.	The GBS is designed to transmit large data files like imagery, weather, maps, and logistics information in a very short amount of time.	ATO Execution

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Global Command and Control System (GCCS)		GCCS is an automated information system designed to support deliberate and crisis planning with the use of an integrated set of analytic tools and flexible data transfer capabilities.		ATO Execution Detailed Planning Assessment and Analysis Strategy Development
	Common Operational Picture	Common Operational Picture is designed to provide the joint tactical picture and unique tactical situation assessment, data fusion, and display to commanders and battle management staff.		ATO Execution Detailed Planning Assessment and Analysis Strategy Development
	JOPES	Integrated C2 system used to plan and execute joint military operations. It is a combination of joint policies, procedures, personnel, training and a reporting structure supported by automated data processing on GCCS.		ATO Planning

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Global Command and Support System (GCSS)		Provides a common set of applications for determining and meeting logistical requirements for DoD forces.		
Global Decision Support System (GDSS)		GDSS is AMC's force-level C2 system supporting TACC execution authority for effective airlift management. It provides AMC accurate, near real-time data required for making decisions concerning the deployment and employment of AMC resources.	Air Mobility Division accesses from AOC. GDSS interfaces with several C2 systems, including C2IPS, ADANS, and the USTRANSCOM GTN.	Detailed Planning ATO Production ATO Execution
Joint Collection Management Tool (JCMT)		JCMT displays intelligence collection requirements and is the DoDIIS migration system for all-source collection management.	An AIS that provides the intelligence community tools for gathering, organizing, and tracking intelligence collection requirements for all intelligence disciplines.	Detailed Planning

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Joint Deployable Intelligence Support System (JDISS) – SCI		A transportable workstation and communications suite that electronically extends a joint intelligence center to a JTF or other tactical user.	Provides a core intelligence function at the SCI level between JTF components.	Strategy Development Detailed Planning ATO Production ATO Execution Assessment and Analysis
Joint Interface Control Officer (JICO) Tools		PC-Based TADIL Analysis Tools – troubleshooting	If TADIL architecture needs adjustment to support combat operations, the JICO makes this adjustment by managing the TADIL system configuration.	
JFACC Planning Tool (JPT)		The JPT, also known as the Air Campaign Planner, is a decision support system that supports deliberate or crisis air operations plans as well as force sizing activities.	Input: NCA, CINC, and theater commander directions, friendly and enemy target lists. Output to offensive: Facility Target List Output to defensive: Defended asset list and priorities, defensive constraints, ROE constraints.	Strategy Development Detailed Planning

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Joint Service Work Station (JSWS)		JSWS is a stand-alone system with all the features and capabilities of the Army JSTARS CGS when equipped with the required communications hardware.		Detailed Planning ATO Execution
Look Forward – NT (Plus – Unix)		Collection management tool that allows visualization of current coverage areas for active reconnaissance assets.		Detailed Planning
Multi Source Tactical System (MSTS)/Airborne Broadcast Intelligence (ABI)		MSTS provides intelligence information to the cockpit. It is a transportable/deployable computer display system capable of providing en- route situational awareness via N-RTIC.	Space Application. The system processes intelligence data received via the TDDS, TIBS, and TADIL broadcasts and graphically depicts threat warning information on a moving map display.	ATO Execution
Operational Model Exploiting GPS Accuracy (OMEGA)		GPS accuracy prediction capability hosted on a PC	Space Application. Automatic calculation of Pk for GPS-aided munitions.	Detailed Planning ATO Execution

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
	PLGR	PLGR provides real-time, precise position data for all combat elements to the battlefield information systems.	Standard Precision Light-weight GPS Receiver used for OMEGA Updates.	Detailed Planning ATO Execution
Joint Munitions Effectiveness Manual (JMEM)		PC/Windows Joint Munitions Effectiveness Manual	Weaponeering	Detailed Planning ATO Production
PC-I3		Imagery, Intelligence and Interpretation		Detailed Planning ATO Production
	Broadsword	Web client for accessing multiple data bases.		
	Automated Deep Operations Coordination System (ADOCS)	Mapping tool.	US Army system	
	Falcon View	Mapping tool.		
Raindrop		Digital point mensuration of imagery for detailed target analysis.		ATO Planning
Requirements Management System (RMS)		Collection Management tool for requesting National imagery.		Collection Management Planning

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Secure Voice and Data		KY-xx, KG-xx, KIV-xx, STU-xxx, STE, etc.	Voice, data, and video	All
Space Missile Analysis Tool (SMAT)		Graphic representation of ballistic and trajectories.	Space application.	Detailed Planning ATO Execution
Special Operations Command Research Analysis Tool and Evaluation System (SOCRATES)		SOCRATES provides Intelligence support to SOF.	SOCRATES encompasses total intelligence support for SOF mission activities, including computers, databases, intelligence communications systems, secure phones, facsimile equipment, imagery processing, and secondary imagery dissemination equipment.	Detailed Planning ATO Execution
STALKER		STALKER is a software program that provides a geographic information system (GIS) functionality which supports area limitation and movement modeling.	Assists the analyst in determining locations that vehicles cannot access due to terrain limitations. (Decreases the search area).	ATO Execution Assessment and analysis
Stand-Alone Message Processing System (STAMPS)		Provides the interface to receive AUTODIN traffic		All

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
TBMCS I3		TBMCS I3 is an automated Air Force intelligence system at theater, component, and unit levels that supports daily mission planning and execution for wartime and peacetime operations.		All
	TWM	Targeting tool.		
	SAA	Situational Awareness and Assessment		
	ELT 2000	Imagery Viewer	Input: Imagery Output: Annotated imagery products.	Detailed Planning, ATO Production, ATO Execution, Assessment, and Analysis
Theater Weather Server (TWS)		NT-based system that provides theater-oriented weather information in support of AOC operations.	Currently standalone. Not fielded in all AOCs. Will interface with TBMCS when it is fielded to replace CTAPS.	All
VTC Equipment and Service		Video Teleconferencing Capability		All
Weapon System Video Workstation (WSV)		BDA tool. Provides playback viewing of cockpit video for BDA analysis.		Assessment and analysis

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Space Battle Management Core Systems				
Worldwide Origin Threat System (WOTS)		PC-based TMD warning system. Performs pairing, correlation, and duplicate message elimination to provide a clear picture of the number of events in the threatened areas.	Space application	ATO Execution
Operations Support		Equipment required to support AOC cells and activities in all levels of operations.		
	Printer-table top			
	Printer-hi speed			
	Printer-photo			
	Plotter			
	Copiers			
	Fax Secure			
	Fax Unsecure			
	Shredder			
	Video Projector			
	Scanner			
	PA System			

SYSTEM	SUBSYSTEM	DESCRIPTION	COMMENTS	PROCESSES
Administrative/Information Support		Equipment required by the internal administrative support function of an AOC.		
	Computers			
	Printers			
	General Admin Supplies			

Appendix C

REQUIRED CAPABILITIES OF TODAY'S AOC

REQUIRED CAPABILITIES OF CURRENT AOC PERSONNEL
- AOC leaders must be experts in airpower planning, direction, and execution
- AOC leaders must understand both joint and combined operations
- AOC leaders must flexibly direct changes as the situation dictates
- AOC leaders require creative problem-solving skills for unfamiliar enemy environments
- AOC personnel must be forged into interactive teams
- AOC personnel must understand defined authority of the JFACC and his chain of command
- Airpower leaders must have extensive experience, education, and training

REQUIRED CAPABILITIES OF CURRENT AOC TECHNOLOGY
- AOC technology must be able to manage numerous air and space platforms throughout the theater
- AOC technology must continue to improve, looking ahead to future needs
- Technology must be fully integrated among all services and support a variety of joint operations
- Technology development must remain flexible and prepare for an uncertain future
- All airpower functions must be supportable within the AOC
- Technology must allow for theater-wide communication and dissemination of airpower orders
- Integration of new technologies are required to insure continued US and allied superiority

REQUIRED CAPABILITIES OF CURRENT AOC PROCESSES
- AOC processes must support the JFACC and his operational airpower objectives
- Specific strategic, operational, and tactical level planning must be effectively accomplished
- The AOC must orchestrate all airborne elements to gain unity of effort across the battle space
- The AOC must integrate joint and coalition airpower—personnel, technology, and processes
- The AOC must effectively control all aspects of theater airpower, and be supportive in execution
- New technologies such as space, unmanned vehicles, and stealth, must be sufficiently integrated
- AOC processes must develop a seamless link to Find, Fix, Track, Target, Engage, and Assess

HISTORICAL AIRPOWER COMMAND AND CONTROL CONCEPTS

HISTORICAL AIRPOWER C2 CONCEPTS FOR PERSONNEL
- Airpower leaders must have expertise in American airpower capabilities and limitations
- Airpower leaders must understand the capabilities and limitations of coalition forces
- Airpower requires synergistic cooperation among all services (Joint)
- Airpower leaders must learn and understand the unique qualities of the enemy
- Airpower leaders must be flexible and able to adapt to an uncertain future
- Leaders must be fully qualified, educated, and train together during peace-time
- Personnel must be prepared to execute airpower as a principle force
- All joint airpower leaders must agree on formal airpower chain of command authority

HISTORICAL AIRPOWER C2 CONCEPTS FOR TECHNOLOGY
- Airpower requires a variety of different aircraft to accomplish unique functions (full spectrum)
- Airpower technology must stay ahead of possible threats
- C2 centers must support all services (Joint)
- Airpower development must not be static, rather it should be dynamic and adaptable
- Airlift capabilities are paramount and require an integrated management system
- Air tasking orders require effective and efficient means of communication and dissemination
- Space capabilities must be fully exploited and integrated into operations

HISTORICAL AIRPOWER C2 CONCEPTS FOR PROCESSES
- Airpower C2 must be under the authority of a single airman
- Airpower operations require detailed campaign planning
- Airpower missions must be prioritized with air superiority first
- Airpower planning requires a deliberate targeting selection system
- Airpower must have centralized control
- Airpower authority, and theater procedures, must be formalized across services (Joint)
- Delegation of authority must be followed by decentralized execution
- Assimilating, developing, and evaluating airpower processes must occur prior to war
- Airpower C2 must effectively integrate joint and coalition partners
- Leaders must prioritize assets, missions, and targets for unity of effort across the theater

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